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Corporate Income Tax As a Real Option on Corporate Earnings

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Abstract

The conventional wisdom has been that lowering the corporate tax will enhance economic growth and hence create more jobs. If merely lowering the tax rate can accomplish this, then elimination of corporate tax should create an economic boom. However, despite this possibility, the United States has yet to make a shift to Value Added (VAT) or consumption based tax system. Moreover, one of the most popular criticisms of the corporate form of business organization is the "double taxation" of dividends. It is argued that corporate income is taxed once at the corporate level and second at the shareholder level as dividend income tax. Even though this concept assumes that taxes follow the money rather than the economic unit, policy makers have tended to advocate reduction in or elimination of the tax on individual dividend income. In addition, elimination of corporate tax according to the stance of policy makers and lobbyist should spur economic growth and avoid the perceived double taxation of dividends. Yet, no pro-business entities have proposed the elimination of corporate taxes. The objective of this paper is to demonstrate that among other reasons, the corporate tax system provides an option contract on the earnings of the corporation. The corporation is the seller of the contract, while the government is the holder of the call option contract. If the corporate sales exceed the break-even sales, the government and the shareholders split the profit based on the firm's corporate tax rate. If on the other hand the sales volume is below the break-even point, all taxes collected on sales are used to offset the shortfall. Thus the existence of corporate tax in and of itself has value to the corporation and hence the shareholders.

Keywords: Options, Corporate tax, Consumption tax, Value-added tax, Public goods

1. Introduction

The debate on the level of corporate tax and its effect on entrepreneurship and economic growth are age-old. Over the years most of this debate has centered around the need to pay for public goods versus the negative impact of taxes on investment decisions. In a market economy, the government must pay for the public goods it provides by levying taxes on its citizens. The corporation, as a legal economic unit, must also share this burden in as much as it consumes public goods. In the United States, the cost of public goods and government is allocated based on the income of its citizens, hence the corporate income tax burden on corporations. Under the current tax system, corporations face a maximum average tax rate of 35%, with the marginal tax rate going as high as 39% for the $100,001 to $335,000 income tax bracket. According to the *Internal Revenue Service Statistics of Income- 2005*, corporations paid an average tax rate of 25.98% on their income. As a percent of gross receipts, the corporate income tax represented only 1.374%.

Garner (2005) calculated the percent of federal receipts from corporate income tax to be 10.1% in 2004. This number contrasts with 82% from combined individual income taxes and social insurance and retirement receipts. Based on the attention given to corporate tax issues, one would expect its share of federal receipts to be much higher. This statistic seems to make corporate tax trivial. The relevant statistic is not the taxes actually paid by the corporations, but the taxes collected from consumers by the corporations. Corporations pay for all their expenses from the revenue generated from operations. Taxes are a business expense, hence deductible from revenues. Good capital budgeting practice requires that all incremental cash flows associated with a project be included in the capital budgeting decision process. The relevant tax rate for this process is the marginal tax rate. The difference between the projected taxes and actual taxes paid on the project is the source of the benefit and the reason for the resistance to the elimination of the corporate tax system.

Corporate taxes have a way of adversely influencing investment decisions. The concept of accelerated depreciation groups assets into depreciable lives that are independent of the economic life of the asset. This practice tends to

arbitrarily penalize investments in assets grouped into longer lives while rewarding shorter-lived assets whose shorter depreciable lives increases the present value of a project's expected cash flow and hence its acceptability.

The corporate tax system is largely responsible for the existence of Tax Havens. Gravelle (2009) contend that the United States government loses both individual and corporate income tax revenue from the shifting of profits and income into low-tax countries (tax havens). He estimates that costs up to $60 billion in lost revenues. Bellak and Leibrecht (2009) studied the effect of low corporate income tax rates on Central- and East European countries on foreign direct investments (FDI). They conclude that there is an inverse relationship between corporate tax burden and FDI. The show that a one-percentage point decrease in the tax rates will increase FDI inflows be 1.4%.

Another distortive effect of corporate taxes, resides in the fact that taxes are a cost of doing business. The existence of corporate taxes affects the cash flow available to suppliers of capital. Since investment projects are evaluated on an after tax basis, the level of operating income needed to achieve profitability is elevated. Thus, the corporate income tax system reduces the pool of available investments.

The distortive effects of corporate taxes are perhaps most salient in capital structure decisions. Interest payment to creditors is considered a business expense for tax purposes, whereas dividend payment to shareholders is not. It is because of this disparaging treatment of equity that led Modigliani and Miller (1958) to conclude that in the absence of risk and bankruptcy costs, the optimal capital structure would be 100% debt. The tax shield from interest payment reduces the cost of capital and hence increases the value of the firm. In response to this preferential treatment of debt, opponents have advocated eliminating the personal income tax on dividends, describing it as double taxation.

Hines and Summers (2009) studied the effect of corporate tax on globalization. They conclude that the greater international mobility of economic activity, and associated responsiveness of the tax base to tax rates, increase the economic distortions created by taxation. They find small open economies rely much less heavily on corporate and personal income taxes, but more on consumption-type taxes, including taxes on sales of goods and services and tariffs. Hines and Summers argue that the United States government faces both greater expenditure demands and very limited ability to finance these expenditures by greater mobility of the tax base and competition from other parts of the world for mobile economic activity. Despite the benefits of reduction/elimination of the corporate tax system, the U. S. government still does not favor implementation of some form of consumption-based tax.

The need to pay for the cost of public goods is primary argument for the existence of corporate tax. Public goods, by definition, possess characteristics that make its provision by the private sector inefficient. Filoso (2010) argues that this view assumes that entrepreneurs are unable to overcome the difficulty of non-excludability or non-rivalrous consumption in way that they can earn a profit. According to Filoso, the treatment of the neutrality of corporate income tax is a consequence on the practice in neoclassical economics to build economic models based on peculiar circumstances and then improperly extending their implications to contexts in which the same circumstances may not hold.

Filoso (2010) observes that in the field of Austrian economics, the philosophy of human actions forms the foundation of all theories. Human actions rely on subjective value, imperfect knowledge, and genuine uncertainty. Under the basic premise of praxeology, Filoso argues that any coerced trade between human beings, as in the case of taxes and public goods, must result in a loss to at least one participant, in this case the tax consumer. He concludes that "every tax worsens consumers' satisfaction". In this same light, he argues, "there is no independence between production and distribution, viz; there cannot be such a thing as a neutral tax". The belief that the incidence of taxes will cause the seller to raise prices as taxes push up costs is faulty and violates the concept of marginal utility because if sellers can raise prices before tax, they will not wait for taxes before doing so. Filoso contends that the short-run increase in price is a result of decrease in demand as marginal firms go out of business. The long-run effect on the other hand is a decrease in price as the demand for the input factors of production declines because of the fewer firms in the industry. Moreover, the argument on the effect of taxes on economic growth ignores the asymmetric treat of losses relative to provides. Profits (a result of speculation) are taxed, whereas the tax deductibility of losses assumes that the firm earned a positive taxable income in some other engagement. The consequence of this disparate treatment of profit and loss is that entrepreneurs focus more on avoiding losses (Filoso, 2010). High profit tax rates encourage individuals to engage in more routine tasks and less in innovation, speculation, and forecasting resulting in the decline of economy's growth and capital accumulation (Filoso, 2010).

It is apparent that the corporate income tax system plays a major role in corporate the investment decisions. These decisions in turn determine the output and employment levels within the economy. Despite these distortions, the movement to eliminate the corporate income tax systems is virtually non-existent. The objective of this paper is to show that the lack of interest in abolishing the U.S. corporate income tax is at least partially due to its value to the firm in the form of options. The rest of the paper is organized as follows: section II looks at the role of

value-added/consumption tax as an alternative source of revenue for the government. Section III develops the option value model of the corporate income tax. Section IV provides some concluding remarks.

2. Consumption Tax versus Corporate Income Tax

Most European countries rely on some form of consumption rather than income tax, to finance their public goods. In addition, Hines (2007) noted that, as of 2004, at least 134 countries relied on value-added taxes (VAT) as a substantial source of funding. Thus, the United States stands are somewhat anomalous among high-income countries where value-added taxes are the norm. Hines (2007) presents a comprehensive overview of the role of consumption taxes and concludes that:

"Heavy American reliance on income rather than consumption taxation has not served the U.S. economy well. The inefficiency associated with taxing the return to capital means that the tax system reduces investment in the United States and distorts intertemporal consumption by Americans, meanwhile discouraging U.S. labor supply no less than would consumption tax alternative."

Knirsch and Niemann (2008), proposes the replacement of the corporate income tax by shareholder-based capital income taxation. They show that such a tax system would guarantee investment neutrality of taxation and reduced compliance costs. Neutrality of taxation requires that investment and financing decisions after taxes coincide with the corresponding decisions in a world without taxes. They propose a tax system in which only transactions between shareholders and corporations are subject to tax. Transactions within the corporate sector are not taxable.

Price and Porcano (1992) discuss some of the major concerns about value-added tax. Concerns regarding VATs primarily fall into two categories: regressivity and administrative cost arguments. Of the two arguments, the more daunting and compelling is the regressivity of the VAT wherein the final consumer pays 100% of the taxes on the goods or services they consume. They also point out that "the poor, retirees and young couples earn less and consume a greater portion of their incomes." This regressivity argument assumes that corporations pay the corporate income taxes resulting from their earnings. Nothing could be farther from the truth. Corporations pay taxes on their taxable income: revenues in excess of their expenses. The final consumer of the product or service provides or in other words, is the source and only source of this revenue. The demographic characteristics of the consumer are irrelevant. These same consumers must also pay their own individual income taxes. It has also been argued that VAT is regressive on an annual basis, but not on a lifetime basis. As Price and Porcano (1992) points out, "income taxes in the United States are pay-as-you-go and not based on lifetime income."

The second argument stems from the government's use of tax policies to achieve a nation's social, economic and political objectives. The argument is as follows. Satisfying the national socioeconomic/political objectives will entail modifications to a simple consumption tax system and the increase in complexity will come with high administrative expenses. However, it is arguable that the cost of the VAT system would be comparable to that of our current system.

The case for and against the consumption tax system is predicated on the substitution of the current income tax system with a consumption tax. What if we retain the current personal income tax system and only replace the corporate income tax with some form of consumption tax? Such a system will address all the investment related distortionary effects of the income tax system. However, such a system has received little if any attention. Thus it follows there must be other benefits of the corporate income tax system that negates its adverse investment effects. This paper posits that one of the reasons could be the option value of the corporate income tax to the shareholders.

3. Option Value of the Model of Corporate Income Tax

The use of option models to value contingent claims is no longer a novelty in financial management practice. Capital budgeting decisions can now be refined using real options embedded in the project. Such options include expansion, timing, abandonment, scale and strategic implications. These are actions that the management can take given its experience as the project unfolds. Ross et al. (2008, pp651) discusses the implicit options embedded in capital structure decisions and the concept of stocks and bonds as options. The bondholder's position is described as an embedded option: as a creditor owed principal and interest payments by the shareholders or as a market participant having "sold a put option on the firm to the stockholders with an exercise price" equal to the principal and interest payments. Alternately, shareholders own a call option on the firm with an exercise price equal to the value of the debt. Bondholders assume the role of owners of the firm who have sold a call option to the shareholders. If the value of the firm exceeds the value of debt, shareholders exercise the option by retiring the debt. If on the other hand the value of the firm is less than the value of debt, bondholders take possession of the firm through bankruptcy proceedings.

The above situation is analogous to the government/firm relationship on corporate taxes. The corporation through its management has essentially sold a call option on the firm revenues to the government. Consider a firm's common-size income statement on a "per unit of product sold" basis. From capital budgeting studies, firms make decisions based on an after-tax cash flow. Thus, the unit price received by the firm has embedded within it the portion of the tax liability for the project. Although the consumer has paid the portion of the corporate tax for the consumption of the product or service, the government does not have any claim to this tax until the corporation has generated enough revenue to cover its costs, interest expense included. The total cost at which taxable income equals zero acts as the exercise price of the option. For revenues greater than the exercise revenue, the government receives the contribution margin times the marginal tax rate. As such, the government's receipt of tax revenues is actually a contingent claim dependent on how well the corporation controls its expenses and the degree of public acceptance of the firm's goods/services.

Following the approach of Burger-Helmchen (2007), the conceptual analogy between corporate tax options and financial options following the Black-Scholes (BS) model, is depicted as below:

Similarity Between Financial Options and Corporate Tax Option

Variable	Financial Option	Corporate Tax Option
E	Exercise Price	Operating cost plus Interest expense
S	Stock Price	Revenue from operations
T	Time to expiration	Tax period
σ^2	Variance of the stock returns	Variance of the firm's annual revenue
R	Risk-free rate of return	Risk-free rate of return

With these variable definitions, the Black-Scholes option-pricing model can be used to calculate the value of the corporate tax option.

Black-Scholes Model

$$C = SN(d_1) - Ee^{-Rt} N(d_2) \tag{1}$$

Where

C is the value of the call option

$$d_1 = \left[\ln\left(\frac{S}{E}\right) + \left(R + \frac{\sigma^2}{2}\right)t \right] / \sqrt{\sigma^2 t} \tag{2}$$

$$d_2 = d_1 - \sqrt{\sigma^2 t} \tag{3}$$

N(d) = Probability that a standardized, normally distributed, random variable will be less than or equal to d.

4. Data and Methodology

In order to calculate the tax option premiums, the variables in the Black-Scholes (BS) model had to be modified. In the BS model, the variance of the stock price is replaced the by variance of the firm's total expense turnover ratio, with total expense equal to the difference between sales and taxable income. If this ratio is greater than one, the firm has a positive taxable income. This makes it a more relevant measure of the variability that is comparable to the stock price variability.

The exercise price was also modified to reflect the tax option model. For the government to receive any tax payments, the firm's sales must exceed its total expenses for the accounting period. This expected total expense (ExTEXP) is the exercise price. The exercise price is the projected total expenses based on the five-year average growth rate in total assets. The choice of the appropriate growth rate relies on the belief that planned increases in total expenses are driven by capital budgeting decisions. In addition, the choice of period (five years), though arbitrary, is an attempt to minimize the incidence of structural changes such as mergers and reorganizations, within the firm. The current stock price in the BS model is replaced with the firm's last fiscal year total expenses (TEXP).

The sample space for this study consisted of 34 firms selected randomly from the Dow Jones Composite index. The data was extracted from the firm's 10K filings for years 1997 through 2008. The excel functions for the BS model were used to calculate the option values. Given the price of the options, the study was expanded to identify, if any, the firm operating and/or other characteristics that could explain the cross-sectional variation in the option premiums. The selected explanatory variables were average degree of combined leverage (AvDCL), average Capital intensity ratio (AvCIR), and Average tax rate (ATR). In order to address possible non-linear relationship between the option premium and the independent variables, the variance of the CIR (VaCIR) , the variance of degree of combined

leverage (VaDCL) and the natural logarithm of the variance of the degree of combined leverage (LnVaDCL) were included as explanatory variables. The input data for the regression is presented in Table 2. "EasyReg" statistical software, Bierens (2008) was used to perform the OLS estimation.

5. Results and Analysis

The option values using the excel BS model functions as well as the input variables are presented in Table 1. The results indicate that there is a significant option value in the corporate income tax system. The option premiums ranged from a low of almost zero ($ 6.14E-70) for Wal-mart to a high of $2,628.89 million for Pfizer. It is important to point out that this option premium applies to both the corporation and the government. This is because in the conventional options, the intrinsic (exercise) value of the option accrues to the holder of the option. In the corporate income tax option, the positive taxable income, which is the intrinsic value of the option, is split between the corporation as net income and the government as income tax. The distribution of these benefits is a function of the firm's marginal tax rate.

The results of the OLS estimation of the option premium are presented in Table 3. A backward regression method was used to determine the variables that had significant effect on the variability of the option premium. For each model, the Jarqe/Salmon-Kiefer test was conducted to test for the normal distribution of the errors. The Breusch-Pagan test was conducted to test for homoskedasticity of the error terms. The Akaike, Hannan-Quinn, and Schwarz Information Criteria were calculated as another test statistic to rank the models. Although the full model utilizing all the independent variables had the highest explanatory power as measured by the R-squared statistic (48.77%), the Jarqe/Salmon-Kiefer test rejected the null of normal distribution with a p-value 0.0249. In addition, the null of homoskedasticity was rejected, with p-value of 0.0117. A detailed result for each model is shown in panels A through E of Table 3.

The final model of the option premium has ATR, VaDCL and LnVaDCL as the independent variables. Although the VaDCL variable had a 1.534 t-statistic, its removal (panel E) resulted in a significant reduction in adjusted R^2 to 38.09% as well as the introduction of heteroskedasticity in the error terms. The model explained 40.68% of the option premium consistent with a normal and homoskedastic error term. The results indicate an inverse relation between tax option premium and the average tax rate. The significance of the degree of combined leverage based variables indicates the effect of risk on the option premium. The higher the variability in the DCL, as measured by the variance, the higher the tax option premium.

6. Conclusion

The objective of this paper was to show that despite the opposition to the corporate tax system and its distortive effects on investment decisions, corporations and shareholders have not attempted to repeal the tax system because the benefits that resulting from the existence of the corporate tax system outweigh such concerns. It was further hypothesized that this benefit is tied to an embedded real option in the corporate tax structure. The results of this study have demonstrated and quantified the existence of this option. In addition, it has identified the variables that drive the magnitude of the option outside of the Black-Scholes model parameters.

The combination of the firm's operating and financial risk as measured by the variance of the degree of combined leverage is shown to have a positive relationship with the option premium. Secondly, the analysis shows that the option premium varies inversely with the average tax rate. Thus, decreases in the tax rate results in an increase in the option premium. This is consistent with the relentless demand for a reduction in the corporate tax rate.

This study has tax policy implications. Given that less than 2% of corporate revenue goes to taxes, whereas households (consumers) pay more in expected taxes to corporations, government can raise more revenue from taxes by switching from the current corporate income tax to a consumption tax without raising taxes on consumers. Because corporations will lose the option to retain the collected taxes, advocates of this proposal should be ready to face stiff opposition. The arguments of regressivity and administrative costs made by the supporters of the current system are merely a cover-up for the actual benefit of the system: the value of the tax option.

There are some caveats that go with this result. First, this is an exploratory study with a limited sample size. Further study is required that uses a large sample as well as time interval to test the robustness of this finding. Secondly, the limitations of the BS model stemming from the underlying assumptions of the model are still pertinent. Specifically, the BS model is based on a European option, which can only be exercised on the expiration date. Corporations pay taxes on a quarterly basis. They also are able to claim past tax payments against current losses as well as carry losses into the future for up to twenty years.

References

Bellak, C. & Leibrecht, M. (2009). Do low Corporate Income Tax Rates Attract FDI? – Evidence from Central- and East European Countries. *Applied Economics,* 41, 2691 – 2703. doi:10.1080/00036840701320217, http://dx.doi.org/10.1080/00036840701320217

Bierens, H.J. (2008). EasyReg International, Department of Economics, Pennsylvania State University, University Park, PA 16802, USA (http://econ.la.psu.edu/~hbierens/EASYREG.HTM)

Burger-Helmchen, T. (2007). Justifying the Origin of Real Options and their Difficult Evaluation in Strategic Management, *Schmalenbach Business Review,* 59 (4), 387 – 405.

Filoso, V. The Corporate Income Tax: An Entrepreneurial Perspective. *The Quarterly Journal of Austrian Economics,* 131(11), 99 – 123.

Garner, C. A. (2005). Consumption Taxes: Macroeconomic Effects and Policy Issues, *Economic Review,* 90(2), 5 – 28.

Gravelle, J. G. (2009). Tax Havens: International Tax Avoidance and Evasion. *National Tax Journal,* LXII (4), 727 – 753.

Hines Jr., J. R. (2007). Taxing Consumption and Other Sins, *Journal of Economic Perspectives,* 21(1), 49 – 68.

Hines, J. R. Jr., & Summers, L. H. (2009). How Globalization Affects Tax Design. *National Bureau of Economic Research,* 23, 123-157. doi:10.1257/jep.21.1.49, http://dx.doi.org/10.1257/jep.21.1.49

Internal Revenue Service Statistics of Income. (2005). Corporate Income Tax Returns, Washington, DC 2008

Knirsch , D. & Neimann, R. (2008). Deferred Shareholder Taxation – Implementing a Neutral Business Tax in the European Union. *Accounting in Europe,* 5(2), 101 – 115. doi:10.1080/17449480802510518,. http://dx.doi.org/10.1080/17449480802510518

Modigliani F. & Miller, M. (1958). The Cost of Capital, Corporation Finance and the Theory of Investments, *American Economic Review,* 48, 261 – 297.

Price, C. E., & Porcano, T. M. (1992). The Value-Added Tax Is it a Reasonable Alternative to Raise Federal Revenue? *Journal of Accountancy,* 17, 44 – 48.

Ross S. A., Westerfield R. W., & Jaffe J. (2008). Options and Corporate Finance, in *Corporate Finance* (8th) McGraw-Hill Irwin, Boston, MA, pp. 650 - 664.

Table 1. Results of the Black-Scholes Option Model(All dollar values are in millions)

T/S	TEXP($)	ExTEXP($)	σ	d_1	d_2	$N(d_1)$	$N(d_2)$	Price($)
XOM	395,609	447,017	0.0454	-2.2838	-2.3292	0.0112	0.0099	67.95
UNP	14,314	15,405	0.1504	-0.2969	-0.4473	0.3833	0.3273	531.06
CVX	230,048	267,310	0.035	-3.7745	-3.8095	8.02E-05	6.96E-05	0.15
DD	29,445	29,831	0.079	0.0960	0.0170	0.5382	0.5068	992.38
DIS	30,441	31,713	0.1232	-0.1286	-0.2518	0.4488	0.4006	1179.22
HD	67,698	69,831	0.0623	-0.1858	-0.2481	0.4263	0.40203	1271.90
HPQ	107,891	117,584	0.0498	-1.3503	-1.4001	0.0885	0.08074	215.39
FDX	35,937	39,957	0.0439	-1.9969	-2.0407	0.0229	0.02064	13.30
IBM	86,915	88,431	0.0503	0.0292	-0.0211	0.5117	0.49157	1753.78
GMT	1,173	1,209	0.2279	0.0594	-0.1685	0.5237	0.43311	99.92
CSCO	29,285	34,009	0.1212	-1.0287	-1.1499	0.1518	0.1251	265.42
CHRW	8,001	9,475	0.0176	-8.607	-8.6246	3.75E-18	3.21E-18	5.96E-17
KFT	39,624	43,343	0.0618	-1.1382	-1.1999	0.1275	0.1151	151.55
LSTR	2,466	2,718	0.0173	-4.6022	-4.6195	2.09E-06	1.92E-06	1.78E-05
INTC	29,900	31,594	0.2112	-0.0717	-0.2835	0.4714	0.38841	2037.01
EXPD	5,134	5,963	0.0122	-10.814	-10.826	1.48E-27	1.29E-27	8.42E-27
ALEX	1,747	1,910	0.0336	-2.127	-2.1605	0.0167	0.015364	0.34
LUV	10,745	12,410	0.0822	-1.4989	-1.5811	0.0669	0.056926	25.13
MSFT	36,606	40,857	0.1763	-0.4359	-0.6122	0.3315	0.270205	1284.56
EIX	9,302	9,151	0.0615	0.5815	0.5199	0.7195	0.69845	412.61
PG	67,425	76,506	0.0165	-6.5776	-6.5941	2.39E-11	2.14E-11	3.87E-09
T	104,125	132,017	0.0506	-4.3161	-4.3667	7.94E-06	6.31E-06	0.0088
AA	26,109	27,764	0.1246	-0.2904	-0.4151	0.3857	0.33904	821.25
MCD	17,364	17,929	0.1312	-0.0451	-0.1763	0.4820	0.43003	793.28
KO	24,505	26,904	0.0825	-0.8787	-0.9612	0.1898	0.16822	203.16
VZ	87,595	93,624	0.0620	-0.7599	-0.8212	0.2237	0.20555	680.02
JNJ	46,818	50,662	.08068	-0.7208	-0.8015	0.2355	0.21142	500.90
PFE	38,602	38,049	0.1296	0.3112	0.1816	0.6222	0.57204	2628.89
MRK	14,042	14,167	0.3992	0.2213	-0.1779	0.5876	0.42939	2272.83
MMM	20,161	21,512	0.063	-0.7209	-0.7839	0.2355	0.21655	169.79
ABC	66,758	71,059	0.0357	-1.2403	-1.2760	0.1074	0.10097	121.27
WMT	384,709	421,218	0.0038	-19.361	-19.365	8.23E-84	7.65E-84	6.14E-82
UTX	51,745	58,607	0.013	-8.2401	-8.2531	8.6E-17	7.72E-17	6.81E-15
TRV	20,761	22,830	0.2291	-0.2238	-0.4529	0.4114	0.32531	1243.99

Table 2. Option Premium Analysis Data (Dollar values are in millions)

T/S	Price ($)	ATR	VaDCL	AvCIR	VaCIR	LnPrem	LnVaDCL	AvDCL
CHRW	5.96E-17	0.3838	1.2189	0.2402	0.001	-37.359	0.1979	1.496
LSTR	1.78E-05	0.3847	4424.7	0.2711	0.0024	-10.936	8.3949	-0.287
EXPD	8.24E-27	0.3699	2.325	0.3947	0.0008	-60.039	0.8437	1.27
PG	3.8E-09	0.2916	0.4561	1.5417	0.7016	-19.37	-0.785	1.375
WMT	6.14E-82	0.34	1.181	0.4216	0.001	-187.0	0.1664	0.884
UTX	6.81E-15	0.273	0.6419	1.0199	0.0117	-32.62	-0.4433	1.25
XOM	67.95	0.4125	14.27	0.5746	0.0166	4.2188	2.6578	1.72
UNP	531.06	0.3376	182.36	2.4691	0.2556	6.2749	5.2060	1.054
CVX	0.15	0.4264	6.62	0.6260	0.0043	-1.888	1.8904	1.912
DD	992.38	0.1205	5900.1	1.1574	0.1946	6.9001	8.6827	23.4
DIS	1,179.22	0.3419	47.52	1.7124	0.0120	7.0726	3.8612	4.16
HD	1,272.90	0.3679	83.29	1.4140	13.606	7.1491	4.4223	4.11
HPQ	215.39	0.2082	614.97	0.9094	0.0082	5.3725	6.4216	6.07
FDX	13.30	0.3860	144.06	0.7058	0.0063	2.5875	4.9702	1.358
IBM	1,753.78	0.2959	2922.6	1.1399	0.0137	7.4695	7.9802	13.46
GMT	99.92	0.3306	11101.	4.0128	1.1426	4.6043	9.3148	-15.75
CSCO	265.42	0.2568	3.72	1.5029	0.0324	5.5813	1.3133	1.15
KFT	151.55	0.2842	34.97	1.7200	0.1007	5.0209	3.5543	-2.4
INTC	2,037.01	0.2856	75.98	1.3640	0.0241	7.6192	4.3304	5.053
ALEX	0.35	0.3731	11.01	1.3244	0.0599	-1.056	2.3985	2.01
LUV	25.13	0.3703	79.49	1.6060	0.1871	3.2241	4.3756	-0.287
MSFT	1,284.56	0.2922	24.83	1.6708	1.2222	7.1582	3.2119	1.848
EIX	412.61	0.2969	7.27	3.3203	1.5806	6.0225	1.9842	-0.461
T	0.01	0.3309	1520.9	2.1818	4.6619	-4.733	7.3271	-8.379
AA	821.25	0.2983	128.91	1.3386	0.0148	6.7108	4.8591	7.148
MCD	793.28	0.3081	300.23	1.3791	0.0682	6.6762	5.7046	-0.444
KO	203.16	0.2360	5.33	1.3463	0.0552	5.3140	1.6734	-0.884
VZ	680.02	0.3347	616.27	2.1573	0.0669	6.5221	6.4237	5.498
JNJ	500.90	0.2503	16.15	1.2574	0.0364	6.2164	2.7817	2.153
PFE	2,628.89	0.1821	310732	2.4214	0.0410	7.8743	12.6467	-99.3
MRK	2,272.83	0.2323	7200.6	1.9678	0.0184	7.7288	8.8819	-20.78
MMM	169.79	0.3217	35.66	0.9911	0.0070	5.1345	3.5739	0.482
ABC	121.27	0.3760	868.16	0.2074	0.0013	4.7980	6.7664	1.004
TRV	1,243.99	0.2078	2010.1	4.6054	0.1610	7.1261	7.6060	14.003

Table 3. OLS Regression of the Corporate Tax Option Premium

Varaibles	A Y=Premium		B Y=Premium		C Y=Premium		D Y=Premium		E Y=Premium	
	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff	t-value	Coeff	t-value
ATR	-3250	-1.768	-3365	-2.009	-3532	-2.273	-3236	-2.096	-3720	-2.409
VaCIR	47.28	1.106	48.42	1.167	48.29	1.183				
AvCIR	19.96	0.187								
AvDCL	5.07	0.326	4.39	0.298						
VaDCL	0.005	0.892	0.005	0.894	0.003	1.595	0.003	1.534		
LnVaD	70.97	1.826	72.79	1.985	72.60	2.013	77.14	2.136	99.94	2.973
Intercept	1154.9	1.653	1213	2.038	1275	2.326	1199	2.188	1280	2.297
N	34		34		34		34		34	
R^2 (%)	48.77		48.72		48.55		46.07		41.84	
Adjusted R^2 (%)	37.38		39.56		41.46		40.68		38.09	
F-test	4.28		5.32		6.84		8.54		11.15	
p-value	0.0037		0.00147		0.0005		0.0003		0.0002	
Jarque-Bera	7.383		6.814		5.611[*]		5.211[*]		1.87[**]	
Breusch-Pagan	16.41		14.062		9.012[*]		6.998[*]		6.608	
Akaike I.C	12.91		12.85		12.79		12.78		12.80	
Hannan-Quinn	13.02		12.94		12.87		12.84		12.85	
Schwarz	13.22		13.12		13.02		12.96		12.93	

[*]Significant at the 5% level
[**]Significant at the 10% level
Both the Jarque-Bera and Breusch-Pagan tests are based on a Chi-square (χ^2) distribution.

Could Lehman Brothers' Collapse Be Anticipated? An Examination Using CAMELS Rating System

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Abstract

The collapse of Lehman Brothers, the largest investment bank that has ever declared bankrupt has had a major impact among economies and in most stock markets across the globe. For this reason, the case of Lehman Brothers is being examined by analysing its financial particulars of the last five years (2003-2007) using the CAMELS ratios. Research results showed that its credits were found as bad and doubtful while its management appeared to be unwilling and unable to reverse its declining course. Also, the management was not complying with the rules set by the supervisory authorities while the risk management methods followed is regarded as insufficient proportionally to its size. Finally, the bank appeared to be vulnerable against risks or unstable conditions while the supervisory authorities and the US Federal Reserve should have foreseen that Lehman Brothers presented several signs of decline and react accordingly.

Keywords: CAMELS rating, Financial Institutions Rating Systems, World Economic Crisis, Banks' Supervising Authorities, Credit Rating Authorities

1. Introduction

The current financial crisis that commenced in 2007 has brought forward many weaknesses existing within the globalised financial system, triggering concerns relating to the safety of financial institutions, even states, against potential non-anticipated risks associated with periods of uncertainty (International Monetary Fund, 2009). The presence of defects in supervisory control also emerged, namely the weakness or incompetence of supervisory authorities to prevent similar large-scale crises from taking place, as well as, the "strange" role played by credit rating agencies in the creation of bubbles (Demyank & Ifterkhar, 2009, The Turner Review, 2009).

A series of events that, three years ago would seem unlikely, have led to extreme drops in global growth rates and have sky rocked unemployment rates, along with a sense of insecurity in almost every country in the world. While the crisis was still unfolding, its strength and extent increased continuously, forcing governments, central banks, analysers, investors, businessmen and consumers to constantly review their concepts and expectations. All former anticipations for reaching an era of financial stability, continuous prosperity and market self-regulation collapsed before the rapid economic aggravation (Freund, 2009).

The collapse of Lehman Brothers, the largest investment bank that has ever declared bankrupt, has had a major impact among economies and in most stock markets across the globe (Baldwin, 2009). For this reason, the case of Lehman Brothers is being examined by analysing its financial particulars of the last five years using the CAMELS ratios. The scope of this paper is to examine whether the bank's collapse was only due to the current crisis or whether it was the result of its malfunctioning, in which case it could have been foreseen and overcome by supervisory authorities and by the Fed.

2. The development of CAMELS Rating System

In 1979, the Uniform Financial Institutions Rating System (UFIRS) was implemented in US banking institutions, and later globally, following a recommendation by the US Federal Reserve (Epstein & Martin, 2003, Bauer et al, 1998). This system became internationally known with the abbreviation CAMEL, reflecting five assessment areas: capital, asset quality, management, earnings and liquidity ratios (Cox & Cox, 2006). The CAMELS system focuses on the assessment of the banking system by examining its balance sheet, as well as, profit and loss statement, thus observing the institution's dynamic aspect (Deyoung et all, 2001).

In the new globalised financial system, as with all new financial markets and products, the banks' economic situation can rapidly change than in the past. As a result of the new situation, supervisory authorities were led towards changing their way of approach and assessment, paying more emphasis on ways to overcome and manage risks (Doumpos & Zopounidis, 2009). As a result of this new situation that was created through the development of the financial system, a further area of assessment was added, that of the initial S, indicating market risk. This took place in 1995 by the US Federal Reserve (Fed) and the Comptroller of the Currency (Hafer, 2005), who replaced CAMEL with CAMELS and added a management assessment system scale from 1 (optimum) to 5 (worse) for risk management (Broz, 1997).

The ratios used to produce the results (Gaillard, 2009) and to evaluate the situation (Jeffrey & Thomas, 2002) of the financial institution under examination are:

A. Capital Adequacy Ratio

A bank's capital ratio is a very important index. It can act as a saver for potential risks, as well as, for important decisions that banking institutions take with regard to growth (Shelagh, 2005) and their future course in general. This index is a product of Basil (Kose et all, 2000, BCBS, 2000, 2004, 2005a, 2005b). In order for a banking institution to have capital adequacy, this ratio should be higher than 8%, namely the total amount of capital must be over 8% of its risk-weighted assets.

CAR= (TIER I + TIER II) / RISK-WEIGHTED ASSETS

TIER I: forms the basic and own capital and includes: common and preferred stocks, the bank's minority rights in subsidiary companies, convertible bonds.

TIER II: forms the bank's supplementary capital. This is, also, known as hybrid because it includes amounts of capital deriving from bonds issued by the bank itself; these amounts are long-term and offer reduced guarantees to buyers. TIER I is required to be 50% of the total amount of the numerator. The higher the value of the index, the better the bank's capital adequacy, and the institution can rely on self-financing and have better profitability than other institutions with lower CAR ratios.

B. Asset Quality Ratio

The asset quality assessment is based on evaluating credit risks associated with a bank's portfolios. A bank's ability to detect, measure, monitor and regulate credit risks is also assessed, while taking into account any provisions against bad and doubtful claims.

(TOTAL NON-PERFORMING LOANS>90 DAYS – PROVISIONS) / TOTAL LOANS

The nominator contains the net non-performing loans. The total of non-performing loans over 90 days has been defined by Basil II as a critical point for loan repayment. The provisions include reserve capital withheld by the bank in order to compensate for losses originating from loans the delay of which has been provisioned. The lower the index the more accurate the bank provisions of these delays and consequently, the higher the quality and reliability of its portfolios.

C. Management Quality Ratio

Management forms the mechanism that makes decisions to ensure the bank's smooth course of operation handles risks and exercises control. Thus, proper management in line with regulations in force is essential for the bank's smooth course of operation.

MANAGEMENT EXPENSES/ SALES

This ratio measures the percentage of operating expenses in relation to sales. Management expenses include all the operating expenses borne by the bank, while sales include all interest expenses and similar charges from the bank's profit and loss account. The lower the ratio, the better for the bank because it indicates that it has good management.

D.   Earnings Ratios

Earnings and profitability form the primary source for capital base increases and are examined in relation to interest rate policies and provisions adequacy. These ratios, also, help support a bank's current and future activities. Strong profits combined with its earnings profile reflect a bank's ability to support current and future tasks. More specifically, this ratio reflects the bank's ability to absorb losses, expand its financing, as well as, its ability to pay dividends to its shareholders, and helps develop an adequate amount of own capital. The assessment of earnings is not only performed in terms of amount and profit tendencies, but also in respect of quality and duration.

(a) ROA= NET PROFITS/ TOTAL ASSETS

This ratio correlates net profits with total assets and indicates whether asset management is efficient enough to produce profits. The higher the ratio the more efficient the bank; a satisfactory performance would produce a value between 1% and 2.5%.

(b) ROE= NET PROFITS/ OWN CAPITAL

This ratio correlates net profits with own capital. The higher the ratio the more the bank uses its own capital in an efficient manner. The more efficient a bank is the easier it is to produce money using its own capital.

E. Liquidity Ratios

During liquidity assessment, the current liquidity status of the bank is taken into account in relation to the liabilities it has undertaken. It also tests the bank's ability to deal with changes in its financing resources, as well as, changes in market conditions which alter the fast liquidation of its assets, with the least possible losses.

(a) LOANS TO TOTAL DEPOSITS (L1) = TOTAL LOANS / TOTAL DEPOSITS

This ratio presents the extent in which deposits are maintained for issuing loans and therefore the bank's dependence in interbank markets. The lower this ratio is the better the bank's liquidity status, while a value of less than one offers security for loans since deposits alone are sufficient to cover such loans.

(b) CIRCULATING ASSETS TO TOTAL ASSETS (L2) = CIRCULATING ASSETS/ TOTAL ASSETS

This ratio gives us a bank's liquidity status of circulating assets, such as cash in hand, claims against other banking institutions and its trading, investment and derivatives portfolios. The ratio offers banks the ability to know the extent if their liabilities that may be covered by its not directly available assets. The higher the bank's ratio, the better its liquidity status.

F. Sensitivity to market Ratio

A bank's assessment on sensitivity towards market risks examines the extent to which potential changes in interest rates, foreign currency exchange rates, product purchase and selling prices, affect the bank's profits and the value of its assets.

TOTAL SECURITIES TO TOTAL ASSETS = TOTAL SECURITIES / TOTAL ASSETS

Market forces, especially in the recent years, consist of a major reason for changes in the viability of banks. Price movements in favour of a bank's portfolio may boost the Bank's results whereas unfavorable movements may create severe problems to the Bank. This ratio correlates a bank's total securities portfolio with its assets and gives us the percentage change of its portfolio in changes of interest rates or other issues related to the issuers of the securities. The lower the value of this ratio, the better for the bank since this indicates that its reactions towards market risks are appropriate. On the other hand, a higher value of this ratio would indicate that the bank's portfolio is susceptible to market risks.

3. Research Results

A. CAPITAL RATIO

2003 CAR= (13,174 TIER I + 2,226 TIER II) / 156,031 WEIGHTED = 9.870%

2004 CAR= (14,921 TIER I + 2,925 TIER II) / 185,727 WEIGHTED = 9.609%

2005 CAR= (16,794 TIER I + 3,407 TIER II) / 221,434 WEIGHTED = 9.123%

2006 CAR= (19,191 TIER I + 5,881 TIER II) / 287,021 WEIGHTED = 8.735%

2007 CAR= (22,491 TIER I + 7,645 TIER II) / 414,638 WEIGHTED = 7.268%

Results in Table 1 show that Lehman Brothers maintained a very low capital ratio while in 2007 this fell below the limit of 8%. The ratio decline was continuous over the years. This means that the financial situation of Lehman

Brothers was not good and continued to get worse each year. Its bad and doubtful claims were very high while its access to capital markets was difficult.

Its inadequate capitals made Lehman Brothers unprotected against regular and extraordinary risks, making its support by shareholders or other sources a matter of urgency. Supervisory authorities should have exercised immediate pressure and should have imposed strict measures from the time its capital inadequacy had reached the levels considered as unsafe for the Group's survival.

B. ASSETS RATIO

2003 (852 NON-PERFORMING - 459 PROVISIONS) / 15,310 LOANS= 0.02567

2004 (1,188 NON-PERFORMING - 563 PROVISIONS) / 18,763 LOANS= 0.033316

2005 (1,255 NON-PERFORMING - 649 PROVISIONS) / 21,643 LOANS= 0.027986

2006 (2,054 NON-PERFORMING - 1,119 PROVISIONS) / 27,971 LOANS= 0.033433

2007 (4,073 NON-PERFORMING - 1,731 PROVISIONS) / 43,277 LOANS= 0.054115

As mentioned during this analysis of the asset quality ratio, the lower its value the better for the organisation being examined. In the case of Lehman Brothers, this ratio tended to increase with the exception of 2006 when it was characterised only by minor increase. Indicatively, its value in 2003 was 2.5% which was more than doubled in 2007 reaching 5.4% (Table 2). The results that emerge from the asset quality analysis of Lehman Brothers demonstrate its low ability to detect, measure, monitor and regulate credit risks while at the same time considering its bad and doubtful claims; such ability continued to decline each year. The policy adopted by Lehman Brothers in issuing loans was proven to be the worst. By granting loans to insolvent, high-risk borrowers, it led to an increase of its non-performing loans each year, namely its bad and doubtful loans. This fact, combined with the results from its capital ratios, was detrimental to its survival and has finally led to its collapse. Supervisory authorities, along with the US Federal Reserve, should have foreseen the critical situation it was in from the results of its asset quality ratios and make strict recommendations towards immediate improvements, by restraining its credit policies and thoroughly assessing potential borrowers, in order to improve Lehman Brother's internal control.

C. MANAGEMENT RATIO

2003 4,750 / 17,287 = 0.274773

2004 6,386 / 21,250 = 0.300518

2005 7,929 / 32,420 = 0.244571

2006 9,536 / 46,709 = 0.204158

2007 10,599 / 59,003 = 0.179635

The management of banking institutions, just like the management of enterprises, determines its operation through decisions, ensures the bank's smooth business, handles risks and exercises control. As shown by the Lehman Brothers' management ratios (Table 3), its management has shown signs of improvement and the ratio remains in relatively high levels. This indicates either that its operating expenses have improved in combination with its sales or that its sales have increased. As has emerged by these numbers, the decline of this specific ratio was due to sales, namely the issuing of more loans. By combining results with the above-mentioned ratios it emerges that many of these loans were bad, approved as a result of poor borrower assessment, a task that falls within the responsibilities of the management of Lehman Brothers. The bank's management should have been more flexible and cooperative with respect to recommendations received by supervisory authorities; the latter should have taken further control of the situation and of the policies followed by the bank.

D. EARNINGS RATIOS

2003

ROA = 1,699 NET PROFITS / 312,061 TOTAL ASSETS= 0.005444

ROE = 1,699 NET PROFITS / 13,174 OWN ASSETS= 0.128966

2004

ROA = 2,369 NET PROFITS / 357,168 TOTAL ASSETS= 0.006633

ROE = 2,369 NET PROFITS / 14,920 OWN ASSETS= 0.15878

2005

ROA = 3,260 NET PROFITS / 410,063 TOTAL ASSETS= 0.00795

ROE = 3,260 NET PROFITS / 16,794 OWN ASSETS= 0.194117

2006

ROA = 4,007 NET PROFITS / 503,545 TOTAL ASSETS= 0.007958

ROE = 4,007 NET PROFITS / 19,191 OWN ASSETS= 0.208796

2007

ROA = 4,192 NET PROFITS / 691,063 TOTAL ASSETS= 0.006066

ROE = 4,192 NET PROFITS / 22,490 OWN ASSETS= 0.186394

An assessment of Lehman Brothers' earnings reveals that its profits are low and insufficient (Table 4). It is obvious that the bank lacks in several areas to such an extent that it is led towards its collapse. As mentioned earlier in the presentation of ratios, a fair price for ROA would be between 1% and 2.5%. This specific ratio is found well below these limits and, despite the fact that it was moderately increasing until 2006, it remained at low levels while further decreasing in 2007.

The results of Lehman Brothers' earnings ratios show that ROE is close to the average of the acceptable range. Its profits seem to be continuously increasing over the last five years, except 2007, giving the signal of the coming unexpected dramatic collapse. The institution's provisions were proven to be lower than those that should be. Since earnings ratios show a company's ability to support its operations and future activities, the evaluation results of the last five years should have ringed a bell that the bank would face survival issues in periods of potential instability or unexpected risks should it not improve its profits and quality of profits.

E. LIQUIDITY RATIOS

L1

2003 15,310 / 39,999 = 0.38276

2004 18,763 / 50,140 = 0.374212

2005 21,643 / 44,975 = 0.481223

2006 27,971 / 58,609 = 0.477248

2007 43,277 / 86,346 = 0.501204

L2

2003 131,099 / 312,061= 0.420106966

2004 150,077 / 357,168 = 0.420186019

2005 179,362 / 410,063 = 0.437401082

2006 230,175 / 503,545 = 0.457109097

2007 313,103 / 691,063 = 0.4530744669

With respect to Lehman Brothers' liquidity ratios, the results relating to this aspect of assessment (Table 5) have shown that Lehman Brothers' L1 ratio results were satisfactory. This means that its loans were less than its deposits. This could indicate that the bank issued part of its loans using the funds available from its deposits and was in position to withhold part of these funds as reserve. The highest value was in 2007, when the bank issued 50% of its deposits.

To the contrary, the L2 ratio results show that the directly available assets of Lehman Brothers' circulating assets were low. Therefore, in the event of an emergency, the bank would not be able to directly liquidate 60% of its total cash reserves, claims against other banking institutions and transaction portfolios, as well as, its investments in derivatives.

It is apparent that the bank's liquidity status, as compared with its liabilities was poor while its management had no contingency plan that could produce the required flexibility when needed. Moreover, supervisory authorities should have foreseen the risks entailed in Lehman Brothers' liquidity problems and should have imposed regulations and measures to improve its status and prevent its collapse.

F. SENSITIVITY RATIO

2003 142,218 / 312,061= 0.45573782

2004 174,598 / 357,168 = 0.488839986

2005 140,743/ 410,063 = 0.343222870

2006 225,196 / 503,545 = 0.44722120

2007 301,234 / 691,063 = 0.43589947

The data available shows that Lehman Brothers suffered from poor management of risk sensitivity (Table 6). The ratio presented several fluctuations throughout the examined period of five years, reaching its peak of almost 50% in 2004. This shows that the bank was neither prepared nor protected to face unexpected risks in periods of instability. As a pure Investment Financial Institution, Lehman Brothers is exposed to even higher interest rate variations,

foreign exchange rates, product purchase and sales prices affecting its profits, as well as, to the value of its assets. Especially, following the globalisation of the financial system, with the extremely rapid developments in data circulation and the changes it entails, Lehman Brothers, being an investment bank, should have ensured its protection against market risks. On the other hand, supervisory authorities had the obligation to diagnose the problem at hand and impose strict measures to protect and secure Lehman Brothers' profits and assets.

4. Lehman Brothers' Combined Rating Scores

The combined rating scores of banks using the CAMELS rating system are usually conducted to compare results among different banking institutions. This enables us to draw conclusions on which banking institutions are in better condition and which suffer. Given that this paper analysis concerns only Lehman Brothers, and therefore it does not intents to rate the total number of banks within a sector, this paper aims at comparing the results of this particular bank across several years, in order to see whether CAMELS may consist of a reliable method to foreseen future problems of banks. This method works as follows:

All individual sector ratios analysed above are scaled from 1 to 5, with five indicating the highest performance and one the lowest. Then, an importance coefficient is (subjectively) selected, again in a scale of 1-5, for each CAMELS assessment area. The results prove that the coefficient of each assessment area for a specific year is multiplied by the score of the respective ratio representing that particular area (for example, the capital adequacy coefficient is multiplied by the score of the CAR ratio for that year) while the remaining areas are then added in the same way as the first. The higher the result the better the status of the bank (or banks) being examined. In this case, the coefficients selected for the individual areas are: C=3.5 A=1.5 M=1 E=3 L=2 S=2. The results and data of the assessment are shown in Tables 7 & 8.

From the combined rating assessment of Lehman Brothers using the CAMELS method it emerges that the best years in terms of combined assessment is 2005 and 2006 while the bank's situation became notably worse the following year, which was also the worst year out of the five-year examined period. This is expressed as follows: in 2007, compared with the previous years, Lehman Brothers was found at the worst possible situation. Its credits are considered as bad and doubtful while its management appears to be unwilling and unable to reverse its declining course. The management is not complying with the rules set by the supervisory authorities while the risk management methods followed is regarded as insufficient, proportionally to its size. The bank appears to be vulnerable against risks or unstable conditions. Based on Camels' ratings examination, the supervisory authorities and the US Federal Reserve should have foreseen that Lehman Brothers presented several signs of decline, which were evident from the analysis of its data and should have taken strict steps and measures in order to prevent the possibility of and its actual collapse.

5. Conclusions

The current economic crisis has greatly stirred the foundations of the financial system and its future across the globe. The financial map is now irreversibly marked with the collapse of large financial colossi, such as Lehman Brothers which was the object of research in the present study. Yet, the CAMELS rating analysis showed that the Group's collapse was not, only, due to the outbreak and extent of the crisis. The role played by credit rating agencies is extensive considering that Lehman Brothers was in fact an investment bank (the fourth largest) that collapsed while having received excellent ratings. For reasons of speculative gains, the precise Group was presented as a healthy organisation, concealing its problematic status while its portfolio consisted of a pile of bad and doubtful structured bonds.

The US Federal Reserve was, also, greatly responsible, as following the results of the above CAMELS analysis, it should have foreseen the upcoming collapse and impose strict measures to Lehman Brothers, accompanied by strict monitoring to ensure compliance (Greenspan, 2008). To the contrary, the Fed did not proceed with such actions and further refused to finance Lehman Brothers in times of difficulty, as it had done in the case of Bears Stern a couple of months earlier, when it had guaranteed its sale and had later proceeded with state ownership of Fannie Mae and Freddie Mac, with loans amounting to 12 trillion dollars in their portfolio. Unfortunately, it had not predicted the chain of events that would follow the collapse of Lehman Brothers nor its size and intensity.

The poor ratings scored by Lehman Brothers over the last five years before its collapse, should force supervisory authorities to review their way of operation, becoming more effective and diagnostic in predicting and interpreting possible market upheavals, in order to avoid any similar events (Altman & Rijken, 2004). Currently, Basel III guidelines are supposed to treat these discrepancies, giving more emphasis on the enhancements of equity (TIER I). Finally, credit rating agencies should, also, review their way of operation in such a way as to ensure transparency of assessments and maintain their international market worthiness.

References

Altman, E. I. & Rijken, H.A. (2004). How rating agencies achieve rating stability. *Journal of Banking and Finance*, Vol. 28, 2679–2714.

Baldwin, R. (2009). The great trade collapse: What caused it and what does it mean?. Introduction in *The great trade collapse: causes, consequences and prospects,* CEPR, November.

Basel Committee on Banking Supervision BCBS, (2000). *Range of Practice in Banks' Internal Ratings Systems*. Discussion Paper, Bank for International Settlements, Basel, January.

Basel Committee on Banking Supervision BCBS. (2004). *International Convergence of Capital Measurements and Capital Standards - A Revised Framework*. Bank for International Settlements, Basel, June.

Basel Committee on Banking Supervision BCBS. (2005a). *Studies on the Validation of Internal Rating Systems*. Working Paper No. 14, Bank for International Settlements, Basel, February.

Basel Committee on Banking Supervision BCBS. (2005b). *Validation of low-default portfolios in the Basel II Framework*. Newsletter No. 6, Bank for International Settlements, Basel, September.

Bauer, P.W., Berger, A.N., Ferrier, G.D. & Humphrey, D.B. (1998). Consistency conditions for regulatory analysis of financial institutions: A comparison of frontier efficiency methods, *Journal of Economics and Business*, Vol. 50, 85–114.

Broz, L. (1997). *The International Origins of the Federal Reserve System*. Cornell University Press.

Clark, J.A. & Thomas F. (2002). X-Efficiency in Banking: Looking beyond the Balance. *Journal of Money, Credit and Banking*, Vol. 34, No. 4, 987-1013

Cox, D. & Cox, M. (2006). *The Mathematics of Banking and Finance*. John Wiley & Sons Ltd.

Demyanyk, Y. & Iftekhar, H. (2009). *Financial Crises and Bank Failures: A Review of Prediction Methods*. FED Of Cleveland, Working Paper 09 04R.

Deyoung, R., Flannery, M.J., Lang, W.W. & Sorescu, S.M. (2001). The Information Content of Bank Exam Ratings and Subordinated Debt Prices. *Journal of Money, Credit and Banking*, Vol. 33, No. 4, 900-925.

Doumpos, M. & Zopounidis, C. (2009). A Multicriteria Bank Rating System. *European Working Group "Multiple Criteria Decision Aiding",* Spring, Series 3, No 19, 17-19.

Epstein, L. & Preston, M. (2003). *The Complete Idiot's Guide to the Federal Reserve*. Alpha Books.

Freund, C. (2009). *The trade response to globaldownturns*. Section II, Article 7, in "The great trade collapse: causes, consequences and prospects", CEPR, November.

Gaillard, N. (2009). The Determinants of Moody's Sub-Sovereign Ratings", *International Research Journal of Finance and Economics*, Issue 31, 194-209.

Greenspan, A. (2008). *We will never have a perfect model of risk*. Financial Times, March 16, 2008.

Hafer, R. W. (2005). The Federal Reserve System: An Encyclopedia*,* Greenwood Press, Vol. 451: 280.

Heffernan, S. (2005). *Modern Banking, Cass Business School*. City University, London.

International Monetary Fund (2009). *Global Financial Stability Report.* Chapter 1, October, 5.

Kose, J., Saunders, A. & Senbet, L.W. (2002). A Theory of Bank Regulation and Management Compensation. *The Review of Financial Studies*, Vol. 13, No. 1, 95-125.

The Turner Review (2009). *A regulatory response to the global banking crisis*. Financial Services Authority, March, 1-117.

Table 1. CAR

YEAR	CAR
2003	9,870%
2004	9.609%
2005	9.123%
2006	8.735%
2007	7.268%

Table 2. Assets Ratios

YEAR	ASSETS RATIO
2003	0.02567
2004	0.03331
2005	0.02800
2006	0.03343
2007	0.05412

Table 3. Management ratios

YEAR	MANAGEMENT RATIO
2003	0.274773
2004	0.300518
2005	0.244571
2006	0.204158
2007	0.179635

Table 4. Earnings Ratios

YEAR	ROA	ROE
2003	0.005444	0.128966
2004	0.006633	0.15878
2005	0.007950	0.194117
2006	0.007958	0.208796
2007	0.006066	0.186394

Table 5. Liquidity Ratios

YEAR	L1	L2
2003	0.382760	0.420106966
2004	0.374212	0.420186019
2005	0.481223	0.437401082
2006	0.477248	0.457109097
2007	0.501204	0.453074466

Table 6. Sensitivity Ratios

YEAR	SENSITIVITY
2003	0.455738
2004	0.488840
2005	0.343223
2006	0.447221
2007	0.435899

Table 7. Combined Rating Scores

YEAR	2003	2004	2005	2006	2007
CAR	9.870%	9.609%	9.123%	8.735%	7.268%
RATING	5	4	3	2	1
ASSET	0.02567	0.03331	0.02800	0.03343	0.05412
RATING	5	3	4	2	1
MANAGEMENT	0.274773	0.300518	0.244571	0.204158	0.179635
RATING	2	1	3	4	5
ROA	0.005444	0.006633	0.007950	0.007958	0.006066
RATING	1	3	4	5	2
ROE	0.1289661	0.15878	0.194117	0.208796	0.186393953
RATING	1	2	4	5	3
L1	0.382760	0.374212	0.481223	0.477248	0.501204
RATING	4	5	2	1	3
L2	0.420107	0.420186	0.437401	0.457109	0.453074466
RATING	1	2	3	5	4
SENSITIVITY	0.455738	0.488840	0.343223	0.447221	0.435899
RATING	2	1	5	3	4

Table 8. Results of Combined Rating

RATING 2003	47
RATING 2004	50.5
RATING 2005	63.5
RATING 2006	66
RATING 2007	43

Very Small Enterprises as Professional Customers: A Qualitative Study

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Abstract

This paper discusses the findings of a qualitative study carried out in the French automotive, construction, and hairdressing sectors concerning the relationship expectations and behaviors of very small enterprises (VSEs). While VSEs represent more than 90% of European enterprises, there has been little research on these business customers. By defining VSEs' characteristics and the role of relationship marketing in studying these targets, this research sheds light on the buying behavior of VSEs. The results of the qualitative study enable the development of a relationship marketing model for the VSEs in each sector, and an identification of the key components of relationships for this target (interpersonal, brand, and offer). The paper concludes with a cross-sectoral model emphasizing the necessity of improving our knowledge of the individual characteristics of VSE owners/managers as an area of future research.

Keywords: Business-to-business, Customer relationship, Relationship marketing, Very small enterprises

1. Very small enterprises and marketing

1.1 Observation: there has been little marketing research on very small enterprises

Small and medium enterprises (SMEs) are contrasted with large enterprises according to a criterion of size, e.g., the number of persons employed. For many years researchers and managers have treated the SME market segment as homogenous. However, there are key differences between a company with 15 employees and a company with 200 employees. In fact, a company with 200 employees (categorized as an SME) has much more in common with a large enterprise having 1 000 employees. Treating the SME market as a single homogenous unit tends to obscure a more segmented approach that leads to a new definition of the market (Goff, Harding, Shah, and Singer., 1998). As competition rises in the medium and large enterprise market segments, very small enterprises (VSEs) [defined as having fewer than ten employees, and representing more than 90% of European companies – Note 1] are becoming strategic customers for major business-to-business companies, which implement relationship programs to retain these "new" customers.

In this context, relatively little marketing research has addressed small businesses. For example, only 22 papers published in peer-reviewed journals dealing with the keywords "relationship marketing", "business-to-business", and "small business" were found on EBSCO in May 2008 – see Note 2 for details of the database consulted: 130 106 and 1 731 articles respectively were referenced under the "business-to-business" and "relationship marketing" keywords .

< INSERT TABLE 1 >

Most of the references identified on EBSCO studied relationship marketing as a marketing practice employed by small and medium enterprises [SMEs] (Coviello, Winklhofer, and Hamilton. 2006, Goff et al. 1998, Hutman and Shaw 2003, Zontanos and Anderson 2004), examining for example the owner's attitude to the concepts of segmentation, targeting, and relationship marketing (Wright, Martin, and Stone, 2003) or the skills needed by the entrepreneurial small firm owner for effectively using the Internet to manage its customer relationships (McGowan, Durkin, Allen, Dougan, and Nixon, 2001).

Robert (1996) studied SMEs through inter-firm cooperation as a condition of small-firm success, as in the activity-actors-resources concept used by the IMP Group (Hakansson and Snehota, 1995). Lastly, other researchers have studied small businesses in the banking industry (Colgate and Bodo 2005, Ennew 1996, Lam and Burton 2006, Madill, Feeney, Riding, and Haines, 2002), and have shown that relationships are important in explaining small business customers' behaviors. But no one has specifically studied VSEs as customers or their purchase of goods, e.g., automotive spare parts, shampoo, or construction materials, rather than services such as banking.

Relationship marketing is a useful research field in studying VSEs. The lack of research in this area might suggest that VSEs are like other businesses and require a traditional business-to-business approach, but an improved definition of VSEs illustrates the opposite.

1.2. VSEs' unique characteristics

Dexter (2002, Dexter and Behan, 1999) defines a VSE as a simple economic decision unit. In an effort to segment business markets, he argues that small business customers are emotional, unlike medium and large enterprises. Although the simplicity of the decision unit is real, the characteristics of VSEs are more complex. VSEs can be defined via five criteria (Bentabet, Michun, and Trouvé, 1999): dimensional (very limited number of persons working in the firm); management (centralized in the owner's hands); functional (the manager decides strategy, operators and employees are versatile); informative (a rich but informal informational system, mainly oral, environmental, and team-dependent); and strategic (strategy is intuitive and rarely formalized). This illustrates the centrality of the owner/manager in the VSEs functioning.

Thus VSEs are not simply "large businesses" in smaller form, and merit a specific business-to-business approach. The VSE Owner's centrality is the source of a certain confusion between the firm and the individual who runs it. This confusion constitutes a challenge for the marketer in targeting and serving these customers.

Based on this definition of the VSE, this paper seeks to understand VSE relationship behaviors with their suppliers through four research questions and a qualitative study.

1. What are the expectations of VSE owners/managers in terms of customer relationships?

2. How do they perceive their suppliers' ability to meet their expectations?

3. What are the behavioral and relational consequences?

4. What are the determinants of their behaviors?

2. Theoretical background: looking for a business-to-business model appropriate to VSEs

Interestingly, from an historical point of view the first business-to-business models were derived from business-to-consumer ones – for example Sheth's 1973 model, derived from Howard and Sheth's 1969 model. At that time, business-to-business decision models for buying were less complex than recent ones, which make them somewhat more matched to VSE characteristics, e.g., a single decision maker in charge.

2.1. From transactional models…

Historically, business-to-business marketers have studied exchanges between two or more firms from a transactional viewpoint. Among the most quoted models, we considered works by Robinson and Farris (1967), Ozane and Churchill (1971), Webster and Wind (1972), Sheth (1973), and Choffray and Lilien (1978) in order to identify their strengths and weaknesses in gaining an understanding of VSEs' buying behaviors. For example, the BUYGRID model (Robinson and Faris, 1967) has been criticized because of the absence of any representation of a buying center. However, in the VSE context the owner is the buyer and the buying center does not exist. This lack is then an advantage in studying VSEs. The Sheth (1973) model emphasizes the central role of the individual in the buying process and lists all the variables that may influence his/her buying behavior. However, the low status accorded to the organization (an exogenous variable) cannot fully resolve the confusion between the firm and its owner/manager.

Among these works, conflict resolution (Webster and Wind, 1972) is of the utmost interest. VSEs as industrial buyers experience high uncertainty and try to minimize perceived risk. Their owners/managers cannot know all of the supply possibilities, or all the consequences of their decisions. This early model implies a real buying strategy, and explains the importance of buying centers in organizations. If the influence of the buying center limits the ability of this model to explain VSEs' buying behaviors (such buying decisions are often simplistic, as we will see in the qualitative study), risk avoidance and buying strategies could take another form.

2.2. … to relational models.

Business-to-business marketing has changed considerably since the mid 1960s and 1970s. Relationship marketing has emerged, following the article by Dwyer, Schurr, and Oh (1987) and the IMP group's work, e.g., Hakansson 1982. A consensus has emerged regarding the key concepts of business-to-business relationship marketing: trust (Donney and Cannon 1997, Moorman, Zaltman, and Desphande 1992, Morgan and Hunt 1994), commitment (Dwyer et al 1987, Morgan and Hunt 1994), satisfaction (Anderson and Sullivan 1993, Fornell 1992), and dependence (Emerson 1962). These concepts have been studied in both business-to-business and business-to-consumer research. Palmatier, Dant, Grewal, and Evans (2006) have synthesized the relationship-marketing studies published in the marketing area; their meta-analysis incorporates the customer, the

supplier, the dyad, relationship mediators (satisfaction, trust, commitment, etc.), moderators, and their consequences for the customer's behavior. This work could be used as a guide for studying VSE behavior.

3. Research Methodology

Since this research focuses specifically on VSEs and their relationships with suppliers of goods (e.g. the purchase of shampoo, hairdryers, scissors, etc. by hairdressers or the purchase of aftermarket auto parts by auto repairers), the study was primarily qualitative in nature

The lack of research dealing with VSEs as customers led us to conduct qualitative research in order to propose a conceptual framework (Glaser and Strauss, 1967), so as to better understand VSE behaviors and to guide further research. Our main aim is to uncover the views and experiences of VSE owners/managers, rather than to test an *a priori* model.

Data were generated via in-depth qualitative interviews with 21 VSE owners/managers and nine suppliers or prescribers on the French market. Three sectors of activity were studied (automotive, construction, and hairdressing) in order to improve the study's validity. The interviews were semi-structured, based on an interview guide dealing with the VSE, its supplier(s), and the relationship; they lasted one hour on average. The interviews were studied by thematic analysis. In order to assess its reliability the qualitative material was double-coded (Miles and Huberman, 1994) by a second researcher and a marketing manager from a business-to-business firm. The inter-coder reliability almost reached the desirable range of 90% agreement, thereby allowing us to examine the cases where disagreements were observed.

4. Findings

4.1. A VSE relationship model

The automotive (five dealers and five VSEs – two independents + three manufacturer affiliates), construction (four dealers or prescribers and six VSEs), and hairdressing (ten VSEs – five independents + five franchisees) sectors produced three different but concordant results. We focus only on the VSE data for this work. The dealers' and prescribers' materials were used to improve understanding during interpretation of the results.

Seven main themes emerged from the automotive sector (listed in Appendix 1a), eleven themes from the construction sector (Appendix 1b), and seven themes from the hairdressing sector (Appendix 1c), allowing us to construct three relationship models applicable to VSEs in these three sectors (Appendices 2a, 2b, and 2c respectively). The structures of the relationships are similar, but each sector displays characteristic elements. Some are due to the environment (e.g. legal in the construction sector), or specific selling structure (three levels of suppliers are clearly identified in the construction sector); others rely on the brand attachment and business-to-consumer relationship concepts (Lacoeuilhe 2000).

Qualitative analysis of these three areas enabled us to identify several factors affecting the customer/supplier relationship in the VSE business-to-business environment. Surprisingly, the hairdressers are the only respondents who mentioned their end customers' needs to explain some of their purchasing choices. Rather than the differences that may exist between the automotive, construction, and hairdressing sectors, their commonalities are interesting because they provide an overview of the key elements of the customer/supplier relationships in this specific business-to-business environment.

Many key variables such as satisfaction, trust, and commitment (e.g., Donney and Cannon, 1997) are reflected in the comments of most interviewees. The concept of dependence is also apparent. This dependence may be real, e.g., contractual agreements between hairdressers and national brands, or created by the power of the brand (Mudambi, 2002). Here we can cite the example of the hairdressing sector where a great number of managers felt compelled to reference the market-leading brand, noting that the end customers expressed a real demand for it.

4.2. The key elements of the relationship

It is important to note that interpersonal items, brand, and offer/supply are the key elements of the customer/supplier relationship. These elements are essential and appear both spontaneously and systematically in the interviewees' replies. However, their hierarchy is particularly volatile from sector to sector and from one individual to another. In addition, the psycho-sociological characteristics of each individual complicate the development of a typology.

4.2.1. Interpersonal

Interpersonal means all the human relationships which may develop between two individuals. Among the three key elements, it is the most difficult to assess because it is based on the emotional and irrational. Nevertheless, we must acknowledge the very important position accorded to interpersonal elements in the case of a direct sale, which will influence the choice of supplier, either positively (loyalty) or negatively (failure). For the supplier the stake is

therefore not only to be appreciated or not but also to express it in monetary terms: the challenge for marketers is huge.

4.2.2. Brand

As regards the brand, VSE owner/manager behaviors range between emotional and rational, which may be seen as an illustration of the duality of the business-to-business/business-to-consumer relationships mentioned above. Managers consider the effect of brand to be a real guarantee, both objectively and subjectively:

- An objective guarantee is the assurance of after-sales service;

- Subjective guarantee refers to the pledge of quality that branded products represent at two levels: for the professional who will use the branded item and for those who will resell it.

It is interesting to note that when these expectations are satisfied, this may lead some respondents to declare an unwavering loyalty to the brand selected—a declaration that may be sincere, but perhaps not altogether clear: the omission of the other key elements does not diminish their importance.

4.2.3. Offer

Of the three elements cited, offer concern is probably the most obvious in its content because it represents the most "professional" expectation. Offer may contain some surprises:

- The contents of the offer. Products and prices define the core elements of the offer and remain very important for VSE owners/managers. Relationship to products remains traditional: VSEs look for technical products, whose trademark is a guarantee of quality. If price is important, it is not only based on the product itself but on all the associated services (delivery, advice, availability, and so on).

- The place of distribution supply. In the various sectors studied, the manufacturer operates alone or in tandem: either it distributes its own products, or it uses an indirect distribution channel. The relationships with the manufacturer or brand are very often marked by the relationships between the entrepreneur and the distributor (which arises as the guarantor of service quality and price negotiation).

While it seems easy to identify the expectations directed towards the offers (which are more concrete than those related to the interpersonal and the brand), we must not stop at their mere appearance, because here too affect plays a role and can easily lead to disappointment or reasoned loyalty (Paavola, 2006).

4.3. Some individual determinants

We have noted above that there is an affective component in the relationships and in the way in which our informants evaluate their suppliers. This is consistent with the work of Dexter (1999), who describes VSEs as emotional economic decision units. Moreover, some individual determinants can explain certain differences among our respondents: age and gender are common issues, but certain determinants appear more differentiating. The professional background of the owner/manager, the legal status of the firm (for example, it appears that people who have not chosen a limited liability status are more personally tied to their firm: "my company is my life"), or if they are running a family business.

The topics for further research that we were able to derive from these individual determinants will be part of the following discussion.

5. Discussion and outlook for future research

5.1. Discussion

This exploratory phase corresponds mainly to our initial research questions, because it allows us on the one hand to develop a list of relational expectations and on the other to compare them with the practices of suppliers in order to explore their impact on the quality of the relationship and the desire to maintain this relationship. The comparison of the main findings from this qualitative phase with the work done by researchers in relationship marketing led to the development of an integrated model diagram (Figure 1) depicting the satisfaction of customers, its impact on the mediators of the relationship (Palmatier et al. 2006), and its future consequences.

Compared with the literature on business-to-business and relationship marketing, the qualitative methodology showed a number of points of agreement:

- There are different levels of relationship analysis such as interpersonal, brand, and company (dealer and manufacturer) levels;

- The brand attachment identified as a business-to-consumer concept (Lacoeuilhe, 2000) has been found particularly applicable to the respondents in these three sectors. This commitment reflects a heuristic choice that is

the branded product for the managers interviewed;

- The relationship path through relational variables such as satisfaction (a criterion necessary but not sufficient for precision), trust (in products, in people, in the company), and dependence is confirmed;

- Risk-reduction strategies (Webster and Wind, 1972): because the purchases of a single VSE do not weigh greatly in the commercial balances of most suppliers, the small business customer tends to identify one or two reliable suppliers through which it seeks to satisfy its entire commercial demand. Its aim is to offset its small purchasing power by maximizing its weight with these suppliers and be recognized as a "good" customer that the supplier should serve well;

- The preferred mode of relationships. There seem to be as many relationships as customers interviewed: the relationship cannot be reduced to these variables and must incorporate the psychology of the consumers, i.e., the VSE owners/managers.

Unlike larger models of business-to-business marketing, but not surprisingly in light of our analysis of the functioning of VSEs, the relationship and the choice of suppliers are decided on an individual basis. Collective decision-making and even less the existence of buying centers (Johnston and Bonoma, 1981) do not emerge from the transcribed conversations of the VSE representatives interviewed.

If this conceptual framework seems rather simple compared to larger models of business-to-business marketing, its uniqueness lies in the relationship referents. The leader of a small company acts both as an individual and as an enterprise in a relationship with a commercial supplier. There is also the status of the brand, very close to the variables studied in business-to-consumer relationships (Lacoeuilhe, 2000) and whose importance in the decision process is high. Brand importance in the demand for goods seems a real issue, in contrast to research in the services area. One factor suggests that we should pursue research towards a better knowledge of the VSE owner/manager as an individual (following the work by File and Prince, 1996 on family businesses). An individual psychological dimension in the relationship appears at a second level of analysis of the qualitative data, and is of interest because it responds to a request and certain deficiencies identified during our literature review: the consumption behavior of VSE owners/managers can be explained in terms of elements relating to their personalities. Respondents displayed individual differences:

- In the place they give to the relationship in their choice of suppliers;

- In the attitude they have towards price negotiation;

- In the relationship they have with the brand (product, security, prestige, etc.);

- And also in the way they are projecting themselves within their companies. Some refer to their business in an impersonal way ("it [the firm] is not followed by manufacturers"), others in the first person ("it [my provider] looks to me").

5.2. Limitations and avenue for future research

The path for future research involves an extended understanding of the individual behavior of the VSE owner/manager, aimed at testing the conceptual model proposed. To pursue this new research objective, authors interested in understanding VSEs' consumption behavior could find interesting subjects in current research on both entrepreneurship and business venturing. Researchers in these fields have suggested some promising concepts for studying the interaction between the firm and the individual who directs it. For example, Bruyat (2001) speaks of the dialogic relationship of the contractor with its project of value creation, and Torres (2003) mobilizes the concept of proximity derived from the Moles and Rohmer law of proxemics (1978). Research on venture capital is also looking more closely at the relationship between the company and its owners: including the owners' characteristics – assessing both their personal and professional achievements – before deciding to invest in a project (Sahlman, 1990).

If we are to be objective on the scope of this qualitative phase it is important to clarify its limitations. The first limitation of this study was the selection of respondents in Paris and its suburbs. The interviewees are not representative of all the VSEs in France (suppliers are more numerous and more easy to access near Paris than in other French regions). The external validity of the study is also compromised by its qualitative nature, and the small sample size of this investigation. However, we used three different sectors to compensate for the bias inherent in the study of a single business and only one type of customer/supplier relationship.

Nevertheless, the cross-sectional analysis of the transcribed conversations allows us, from a more managerial viewpoint, to identify 30 marketing and sales levers that could be used by business-to-business companies to provide the relationship benefits that business customers look for.

References

Anderson, E.W. & Sullivan, M. (1993). the Antecedents and Consequences of Customer Satisfaction for Firms, *Marketing Science*, 12, 125-143.

Bentabet, E., Michun, S. & Trouvé, P. (1999). Gestion des hommes et formation dans les très petites entreprises, *CEREQ (Centre d'Etude et de Recherche sur les Qualifications).* Etude n°72.

Bruyat C. (2001). Créer ou ne pas créer ? Une modélisation du processus d'engagement dans un projet de création d'entreprise, *Revue de l'Entrepreneuriat*, 1, 1, 25-42.

Choffray, J.M. & Lilien, G.L. (1978 B). Assessing Response to Industrial Marketing Strategy, *Journal of Marketing,* 42 (2). 20-31.

Colgate, M. & Bodo, L. (2005). Positive and Negative Consequences of a Relationship Manager Strategy: New Zealand Banks and Their Small Business Customers, *Journal of Business Research*, 58, 2, 195-204.

Coviello, N., Winklhofer, H. & Hamilton, K. (2006). Marketing Practices and Performance of Small Service Firms, *Journal of Service Research*, 9, 1, 38-58.

Dexter, A. (2002). Egotists, Idealists and Corporate Animals: Segmenting Business Markets, *International Journal of Market Research,* 44, 1, 31-51.

Dexter, A. & Behan, G. (1999). Small Business Consumers: the Emotional Economic Unit, *Journal of the Market Research Society*, 41, 2, 171-194.

Donney, P. M. & Cannon, J. P., (1997). An Examination of the Nature of Trust in Buyer-Seller Relationships, *Journal of Marketing*, 61, 35-51

Dwyer, F. R., Schurr, P. H. & Oh, S. (1987). Developing Buyer-Seller Relationships, *Journal of Marketing,* 51, 2, 11-27.

Emerson, R. M. (1962). Power Dependence Relation, *American Sociological Review,* 27, 1, 31-41.

Ennew, C. T. & Binks, M. R. (1996). The Impact of Service Quality and Service Characteristics on Customer Retention: Small Business and their Banks in the UK, *British Journal of Management,* 7, 3, 219-230.

File, K. M. & Prince, R. A. (1996). A Psychographic Segmentation of Industrial Family Businesses, *Industrial Marketing Management*, 25, 223-234.

Fornell, C. (1992). A National Customer Satisfaction Barometer, the Swedish Experience, *Journal of Marketing*, 14, 451-472.

Glaser, B. G. & Strauss, A. L. (1967). The Discovery of Grounded Theory: Strategies for Qualitative Research, The Sociology Press: Mill Valley CA, pp. 261 (fourth paperback printing, 2009).

Goff, J., Harding, D., Shah, R. & Singer, M. (1998). A New Way to Reach Small Businesses, *McKinsey Quarterly,* 1, 3, 172-176.

Hakansson H. (1982). International Marketing and Purchasing of Industrial Goods: An interaction Approach, Wiley, Chichester, 406p.

Hakansson, H & Snehota I. (1995). Developing Relationships in Business Networks, Routledge, London, pp. 418

Howard, J. A. & Sheth J N. (1969). The Theory of Buyer Behavior, New-York: John Wiley & Sons.

Hultman, C M & Shaw, E. (2003). The Interface Between Transactional And Relational Orientation In Small Service Firm's Marketing, *Journal of Marketing Theory & Practice*, 11, 1, 36-52.

Johnston, W.J. & Bonoma, T.V. (1981). The buying center: structure and interaction patterns, *Journal of Marketing*, 45, 3, 143-156.

Lacoeuilhe J. (2000). L'attachement à la Marque: Proposition d'une Échelle de Mesure, *Recherches et Applications en Marketing*, 15, 4, 61-77.

Lam, R. & Burton, S. (2006). SME Banking Loyalty (And Disloyalty): A Qualitative Study in Hong Kong, *International Journal of Bank Marketing*, 24, 1, 37-52.

Madill, J. J., Feeney, L, Riding, A, & Haines Jr., G H (2002). Determinants of SME Owners' Satisfaction with Their Banking Relationships: A Canadian Study, *International Journal of Bank Marketing,* 20, 2, 86-99.

McGowan, P, Durkin, M G, Allen, L, Dougan, C & Nixon, S (2001). Developing Competencies in The Entrepreneurial Small Firm For Use Of The Internet In The Management Of Customer Relationships, *Journal of*

European Industrial Training, 25, 2-4, 126-137.

Miles, M.B. and Huberman, A.M. (1994). Qualitative Data Analysis: An Expanded Sourcebook, 2nd edition, Newbury Park, CA: Sage Publications.

Moles A. et Rohmer E. (1978). Psychologie de l'espace, 2nd edition, Paris: Editions Casterman.

Moorman, C, Zaltman, G & Desphande R (1992). Relationships between Providers and Users of Market Research: the Dynamics of Trust within and between Organizations, *Journal of Marketing Research,* 29, 314-328.

Morgan, R. M. & Hunt, S. D. (1994). The Commitment-Trust Theory of Relationship Marketing, *Journal of Marketing*, 58, 3, 20-38.

Mudambi, S. (2002). Branding Importance in Business-To-Business Markets: Three Buyer Clusters, *Industrial Marketing Management*, 31, 6, 525-533.

Ozanne, U. B. & Churchill, G. A. Jr. (1971). Five Dimension Of The Industrial Adoption Process, *Journal of Marketing Research*, 8, 322-328.

Paavola H. (2006). Categories of Loyalty, Toward Meaning-based Theory of Customer Loyalty, *European Advances in consumer Research*, 7, 420-428.

Palmatier, R.W., Dant, R.P., Grewal, D. and Evans K.R. (2006). Factors influencing the Effectiveness of Relationship Marketing: A Meta-Analysis*, Journal of Marketing*, 70, 4, 136-153.

Robert, J (1996). Small-Firm Success and Supplier Relations in the Australian Boat-Building Industry: A Contrast of Two Regions, *Journal of Small Business Management*, 34, 2, 71-78.

Robinson, P. J., & Farris, C. W. (1967). Industrial buying and creative marketing, Allyn and Bacon, Boston.

Sahlman W.A. (1990). The structure and governance of venture-capital organizations, *Journal of Financial Economics*, 27, 473-521.

Schiemman, M. (2008). Enterprises by size class - overview of SMEs in the EU, *Eurostat, statistics in focus 31-2008*, 7p [Online] Available: http://epp.eurostat.ec.europa.eu/cache/ity_offpub/ks-sf-08-031/en/ks-sf-08-031-en.pdf [February 12, 2011].

Sheth, J. N. (1973). A Model of Industrial Buyer Behavior, *Journal of Marketing*, 37, 50-56.

Torrès, O. (2003). Petitesse des entreprises et grossissement des effets de proximité, *Revue Française de Gestion*, 144, 119-138.

Webster, Jr. F E. & Wind, Y (1972). A General Model for Understanding Organizational Buying Behavior, *Journal of Marketing*, 36, 12-19.

Wright, L. T, Martin, L, & Stone, M (2003). Exploring the Characteristics, Attitudes to Targeting and Relationship Marketing of Small Ethnic Minority Businesses, *Journal of Targeting, Measurement & Analysis for Marketing*, 12, 2, 173-184.

Zontanos, G. & Anderson, A. R. (2004). Relationships, Marketing and Small Business: An Exploration of Links in Theory and Practice, *Qualitative Market Research: An International Journal*, 7, 3, 228-236.

Notes

Note 1. 91.8% of European enterprises have no more than nine employees, according to Eurostat (Schiemman, 2008).

Note 2. Requests to *Business Source Complete* and *Electronic Journal* Service allowing us to explore the databases of both journals concerning marketing and entrepreneurship

Table 1. References studying combinations of business-to-business, small businesses, and relationship marketing (via EBSCO, May 2008)

Keywords (Boolean research AND)	Number of references
"relationship marketing" and "business-to-business"	404
"relationship marketing" and "small business"	22
"relationship marketing" and "business-to-business" and "small business"	22
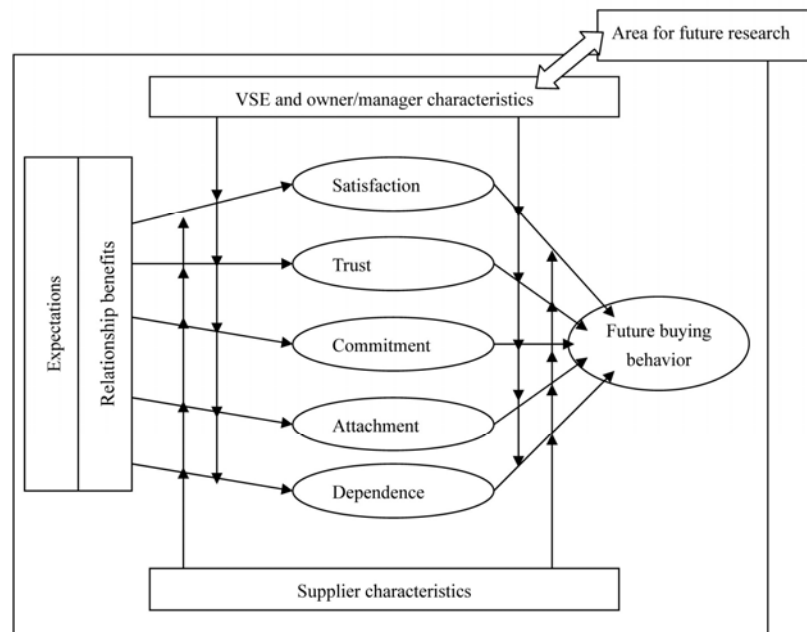
Figure 1. A theoretical model of VSE relationship expectations

Appendix 1a. Automotive themes

Theme	Sub-theme

Relationship elements	- Relationship described as a general atmosphere and specific elements
	  o Meetings
	  o Price
	  o Interpersonal
	  o Honesty
	  o Professionalism
	  o Tensions
	  o Looking for geographic proximity
	  o Service Quality
	  o Recognition and respect
	  o Loyalty (enthusiastic for Citroën affiliates)
	- Relationships tend to deteriorate

Negotiation / collaboration	- Quotas on aftermarket parts - "Chasing time" (i.e., losing a lot of time negotiating with their suppliers) - Business size as a negotiation criteria
Products	- Choice criteria - Multi-platform products
Brands	- Professionalism - Technique - Customer orientation
Business	- Selling cars - Buying parts - Business politics of manufacturer - Little gifts
Management	- Communication - Supply chain - Monitoring - Unreachable sellers - Recognition
Benefits, expectations, fear / development of business	- Business fear - Affiliation is a costly obligation - Widespread use of electronic diagnostic boxes - European legislation

Appendix 1b. Construction themes

Theme	Sub-theme
Suppliers	- Buying strategies and supplier portfolio - Differences among suppliers - Ways of selling products - Negotiation mode is questioned - Personal selling remains efficient - Dealer strategy in pull marketing (when the dealer attracts the consumer) - Supplier choice criteria
Relationships	- Interpersonal
Loyalty and negotiation	- Dealers - Commercial - Negotiation strategies
Relational	- Dealer differentiation - Consequences of interpersonal relationships - Construction is a relational sector - Relationships are business, business is relationships - Relationships, an obligation
Criticisms of suppliers	- Logistics - Technical information - Lack of professionalism
Product	- Choice criteria - Defined by tenders vs. free choice - Brand as a choice - Innovation - Brand, quality, price - Technical products vs. basic products - Need for quality
Brands	- Sign of quality - Quality/price - Brands are communicating with VSE's customers.
Information sources	- Issuer - Medium - Message - Need for technical information - Lack of information about new products
Business	- Payment terms - Rate negotiations - Loyalty programs - Promotions, benefits of loyalty programs
Consequences	- Satisfaction - Service quality - Supplier proximity (supplier adjustment) - Price
Management	- Monitoring - Logistic

Appendix 1c. Hairdressing sector themes

Theme	Sub-theme
Products in presence	- Hair Brands importance - Product brands less importance
Choice criteria	- Product - Price - Services - Innovation

Interpersonal relationships	- Influence on choice criteria
	   o Positive
	   o Negative
	- Moderated by independence *vs.* franchisee

Ideal relationships	- Drawbacks of actual relationships
	   o Ideal relationships
	   o Delivery
	   o Assistance
	   o Training
	   o Advertising
	   o Research for new product

Brands	- Brand image - Brand as quality - Brand as lever of renown and positioning for the hairdressing saloon - Brand as training - Brand as innovation
The patent	- Benefits - Constraints
Relation with end consumer	- Customer Orientation - Demand for products/brands

Appendix 2a. VSE's relationship model in the automotive sector
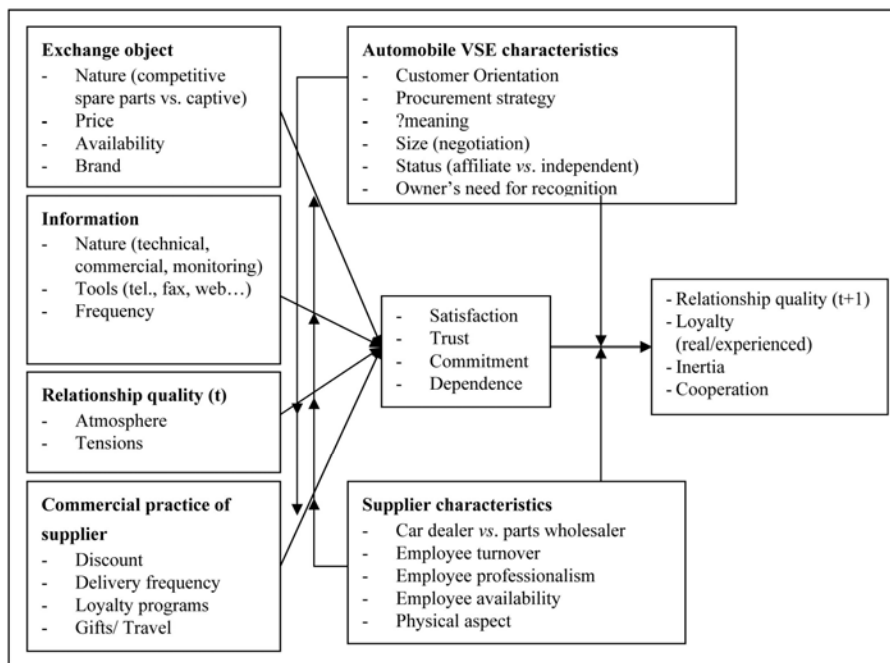
Figure 2a. Variables at stake in the relationship marketing model of an automotive VSE

Appendix 2b. VSE's relationship model in the building-trade sector.
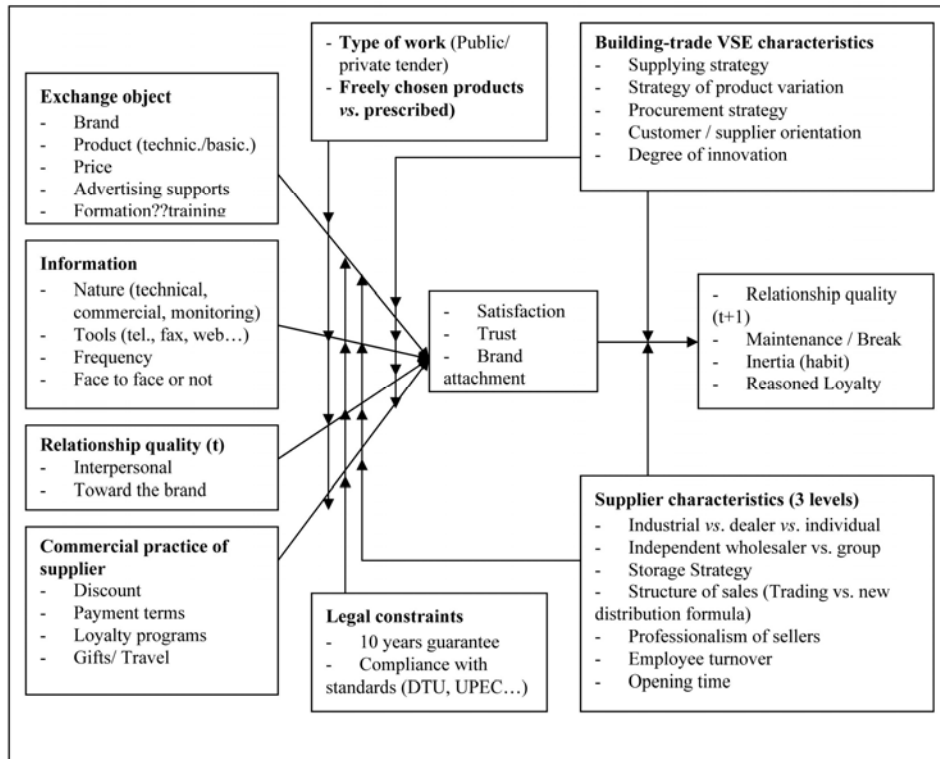
Figure 2b. Variables at stake in the relationship marketing model of a construction VSE

Appendix 2c. VSE's relationship model in the hairdressing sector.
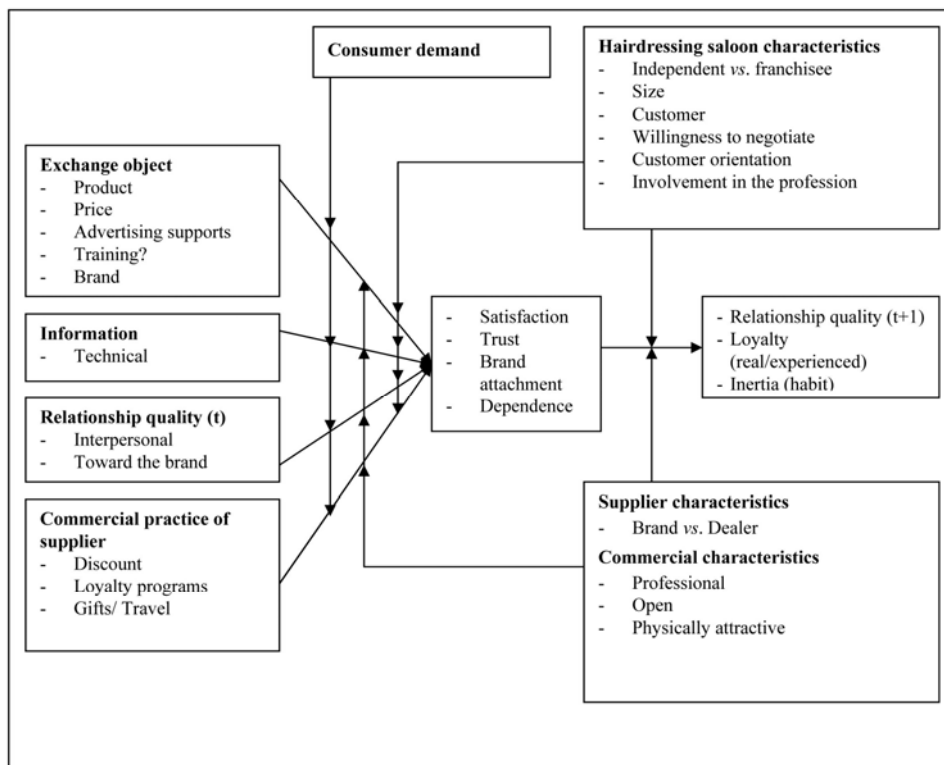
Figure 2c. Variables at stake in the relationship marketing model of a hairdressing VSE

The Complex System Theory for the Analysis of Inter-Firm Networks:

A Literature Overview and Theoretic Framework

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Abstract

In this paper we discuss the body of knowledge known as complex system theory and its relevance to the analysis of inter-firm networks. We start by addressing the development of systems thinking. Through a literature overview, we point out the main elements for the development of systemic thought from its beginning, through its application in business sciences, to the birth of Complex Systems Theory (CST). With these initial annotations we provide an introduction to the concepts of the complex systems theory.

We will underscore those aspects of CST that can be useful to analyze inter-firm networks, in order to highlight the evolutionary dynamics of the networks and to clarify the logical link between the networks' structure and the cognitive processes inside the network and the firms.

In particular we highlight how CST can be an interpretative framework to connect and empower the economic, cognitive, structural and managerial aspects of network business systems.

Keywords: Inter-firm networks, Complex system Theory, Multi-level logic

1. Introduction

Although systemic thought roots back to ancient Greek philosophers (Pythagoras and Plato in particular), the concept of system and its working principles in modern science were first developed in the field of physics and biological sciences.

In the first decades of the 19th century the need for a paradigm shift of scientific methodology adopted for the analysis of phenomena emerged. The weakness of the reductionist, analytical approach was that it did not contain the tools for a complete appreciation of the phenomenal reality as a whole. There was the need to observe the object of study shifting the focus from its isolated parts to the whole, thus considering relations and synergies among its elements.

In this evolution path, in the 1940s, the systemic theory of the biologist von Bertalanffy was introduced.

According to von Bertalanffy (1957, p.58): «*Modern science is characterized by its ever-increasing specialization, necessitated by the enormous amount of data, the complexity of techniques and of theoretical structures within every field. This, however, has led to a breakdown of science as an integrated realm: The physicist, the biologist, the psychologist and the social scientist are, so to speak, encapsulated in a private universe, and it is difficult to get word from one cocoon to the other».*

In his theory Bertalanffy defined some of the key principles of systems, among which: openness and closure, homeostasis and self-regulation, equifinality.

Soon the system theory expanded its domain to the social science and in particular to business science.

At the time in which general systems science theories were developing, another scientific approach was born: Cybernetics (Note 2). Cybernetics, as defined by Wiener (1948), is the science of control and communication in animals and machines. A remarkable contribution given by studies in the field of cybernetics was the notion of feedback as the conveyance of information about the outcome of any process or activity to its source; which is the basis of self-balancing and self-regulating feedback. Cybernetics also led to the formulation of theories which

improved the understanding of self-organization. The characteristics of self-organization are the spontaneous emergence of new structures and new varieties of behavior in open systems that are not in equilibrium (Capra, 1996).

In Italy, the first to conceive the enterprise as a system was Gino Zappa (founder of the Italian business science school) in his book "*Le produzioni nell'economia delle imprese*" published in 1957. According to Zappa, the firm is a unified entity emerging from relations and interrelations linking its constitutive elements, in other words the firm is a system.

In 1972 Anthony Stafford Beer in his book: "*Brain of the firm*" introduced the concept of the firm as a *viable* system, applying cybernetics to management and defining cybernetics as the science of effective organization.

In the 1980s, the advances in this field of research highlighted other properties of systems like *autopoiesis*. Maturana & Varela (1984) noted that *openness and closure* of a system have a complementary nature and that to understand this nature it is necessary to distinguish among organization and structure of the system. The system *organization* is the set of relations among its components, considered both from a static and dynamic point of view. These relations give to the systems its identity, when they change the system changes in a different system. On the other hand, the *structure* of the system is the peculiar way by which a system defined by an organization comes to existence in a determined space and time (Ceruti, 1992).

System of the same kind can have different structures, as well as the structure of a system can change according to external stimulus in order to keep the invariance of the system organization.

The closure of a system refers, indeed, to the organization of the system (*operational closure*), while openness refers to the structure and the system of interchange with the external environment (*thermodynamic openness*). As a consequence a system can be, at the same time, operationally closed and thermodynamically open (Ceruti, 1992).

Maturana & Varela (1984) distinguish also among *heteronymous* and *autonomous* systems. Heteronymous systems change according to the external environment; in other words, in these systems, the adaption to the environment is of primary relevance for internal changes. In autonomous systems, instead, the internal changes of the system are not consequence of changes of the external environment. An autonomous system has an active role, selecting, among the stimuli coming from the environment, those which are "significant" and ignoring those which are not significant. Among those significant, the autonomous systems determines what is the significance that they have for the system and in which way the structure of the system need to be modified to adapt to them. In this way autonomous systems preserve the *identity* of the system, defined by the closure of its particular organization. This "conscious" adaptation is closely connected with the concept of "*cognitive domain*" of autonomous systems. The process of engagement between the system and the environment is called "*structural coupling*" and can be defined as *"[…] history or recurrent interactions leading to the structural congruence between two (or more) systems"* (Maturana & Varela, 1987, p. 209). The stimuli coming from the environment are not considered "inputs", but as mere disturbance which may or may not cause a change of structure of the system. In the interaction among two systems their ontogenic dynamics are configured as mutual disturbances which are the cause of changes of systemic structure in both systems.

For these reasons, structural coupling has connotations of both *coordination* and *co-evolution*.

From these theoretical bases, the systemic and cybernetic theories evolved toward the theory of complex systems (CST).

2. Complex Systems Theory (CST).

A definition of *complexity* is given by Sherman & Shultz (1998) from the Santa Fe Institute:

«*Complexity refers to the condition of the universe which is integrated and yet too rich and varied for us to understand in simple common mechanistic or linear ways. We can understand many parts of the universe in these ways, but the larger and more intricately related phenomena can only be understood by principles and patterns – not in detail. Complexity deals with the nature of emergence, innovation, learning and adaptation*».

In other words a complex adaptive system is a system formed by a set of participants interacting with each other and co-evolving, continuously redefining their future situation.

In the field of Complex System Theory (CST) we can identify three main streams of research: the Santa Fe Institute perspective (Gleick, 1987; Waldrop, 1992; Kauffman, 1993); the European perspective (Prigogine & Stengers, 1979,1984; Nicolis & Prigogine, 1987), and another stream based on European epistemological tradition (Piaget, 1970; Morin, 1977; Bocchi & Ceruti, 1985).

As happened with the systemic theories, the CST found several applications in busyness science (Stacey, 1995;

McKelvey, 1997, 1999; Cohen, 1999; Anderson, 1999, Axeldrod, 1997; Axelrod & Cohen, 2000; Dagnino, 2000, 2004).

Several authors in the field of business science (Tagliagambe & Usai, 1994; Cohen 1999, Golinelli 2010) pointed out that the application of the principles of CST and systemic theory into business science is not simple. It is necessary to ponder the various concepts of these theories to avoid incorrect interpretations of the business phenomena observed.

Notwithstanding these considerations, if well considered, the application of these theories to business and firm organization studies gives a new perspective to the study of the firm, a new "key" to read the business' observable facts shedding the light on new aspects of the behavior of organizational structure of the firm and in particular of the behavior of firms inside business networks (Lewin, 1999)

Axelrod & Cohen pointed out that: *"One of the key benefits of Complex Adaptive Systems Approach is that it helps you see yourself in the context of a population of agents, and helps you see your actions in the context of a population of strategies"* (Axelrod & Cohen, 2000, p. 5).

As we said before, the systemic thought was born to overcome, with a holistic approach, the traditional reductionist-analytical methodology adopted to analyze complex phenomena. This approach was not considering the interactions emerging from the heterogeneous autonomous parts of the observed object.   On the other hand, a pure holistic approach (as that of the first systemic theories) had its limits in describing the reality especially in the business environment.   The first systemic theories were not able to highlight the specific and autonomous identity of the single part and the impact of these peculiar properties on the whole system. With the advances in systemic thought, several researchers acknowledged that holistic and reductionist approaches were not antagonist but complementary (Di Bernardo & Rullani, 1990; Tagliagambe & Usai, 1994; Fontana & Ballati, 1999; Anderson, 1999; Golinelli, 2010).

The systemic approach is, indeed, the third way among holism and reductionism. It considers both the relations among parts forming the system, and the system as a whole made of interrelated parts: a cohesive but not a single object. The whole and the parts are two distinct and autonomous levels, but they coexist in the system. From the interaction between these two levels emerge the evolutionary dynamics both of the system and of its parts (Baum, 1999; McKelvey, 1999)

3. CST in inter-firm networks.

Some of the theoretical aspects of CST can be of great use to analyze inter-firm networks. The application of CST to inter-firm networks highlights the synergies coming from the cooperation among heterogeneous interconnected firms. Understanding the structure and the dynamics of the relations and the interactions among firms is a key step to comprehend the structure and the systemic dynamics of inter-firm networks.

To this aim some of the properties of CST are of great utility (Levanti, 2010; McCharty & Frizelle, 2000). These properties are:

−   *Emergence*. This property relates to the appearance of a new systemic behavior, as systemic response to environmental factors, because of the collective behavior and not of the individual behavior of each part. Some of the path and properties of networked systems come from spontaneous interactions among participating firms; they are not caused by behaviors intentionally controlled or coordinated by the management.

−   *Self-Organization*. This property refers to the unplanned creation of augmented order, emerging from the internal dynamics of the system as learning, process variation, tuning and improvement. The interactions among process variations of the single parts, individual learning and tuning according to the reciprocal exchange of information and the consequential local improvements and adjustments affect the performance of the whole system. The inter-firm network creates endogenous process dynamics that spontaneously bring to enhance its organization (Kauffman, 1993). It constantly models itself, modifying its borders, creating and recreating its stock of knowledge and capabilities harmonizing with the external environment.

−   *Path dependence*. The overall behavior of the network system depends on the weaving among current flows/stimuli received and the structural elements coming from the past stimuli and behaviors (Bertelè, 1994). This implies that historical contingencies have a role, influencing the structure and the behaviors of the inter-firm network (Arthur, 1989).

−   *Operational closure and thermodynamic openness*. The inter-firm network system is autonomous. Its invariant organization makes it possible to identify the system itself, regardless of its specific structure in each space-time momentum (Bertschinger et al., 2006). The system exchanges energy with the external environment in terms of

resources, knowledge and capabilities. From this channel the system receives the stimuli which (after a process of selection) can activate internal structural changes in order to preserve the organization closure and to guarantee the survival of the system.

− *Complexity*. Complexity is a multi-dimensional and multi-disciplinary concept. Smarr (1985) in a famous article on the journal "*Science*" claimed that it is not possible to define and to measure complexity. In spite of the fact that probably, as Smarr says, it is difficult to draw a precise and exhaustive definition of complexity, we can consider a complex system as a system with a high number of parts and of systemic states. To understand the concept of complexity, we have to consider two opposite notions: *diversity* and *unity*. Inter-firm networks are complex systems formed by a set of independent and idiosyncratic firms. These firms are complex *sub-systems* connected one to each other by *feedback loops* leading to the creation a complex organized unit. The inter-firm network system is united thanks to its organization but the single firm that compose the network are autonomous. Hence, the network system is something different than the mere sum of its parts. In the system we find emerging qualities, which are empirically evident but not logically inferable (Morin, 1985).

− *Co-evolution*. Each firm in the network, in order to operate its semi-autonomous strategies, has to continuously adapt to the other firms in the system and to environmental stimuli (Anderson, 1999; Lewin & Volberda, 1999; Volberda & Lewin, 2003). An analogy by Fontana & Ballati, (1999, p.15) explains this concept: «*From an evolutionary point of view, an adaptive organization is like a ship on the open sea that has to rebuild itself staying afloat*».

The properties above imply that, in an inter-firm network system, the interactions are based upon both endogenous and exogenous stimuli. The former result from co-evolution processes activated by the interrelation among the systemic firms; the latter originate from co-evolution processes seeking coherence (both at systemic firm and at network level) with the external environment.

These ways of interrelation point out how the CST considers reality following both a holistic and a multi-level logic.

4. Multi-level logic in CST.

Complex adaptive systems are basically multilevel (McKelvey, 1997). In other words the interactions among different parts take place at different levels of analysis. This implies that there are other levels than the whole and the part. It is possible, indeed, to find sub-systems of several intermediate levels between the whole and the part. The number of these sub-systems depends on the finality and the subject of the analysis. In the field of research on the managerial organization matrix, Baum & Singh (1994) focus their analysis on four levels (intra-organization, organization, population, community); also Kontopoulos (1993) finds four levels (local, semi-local, semi-global, global); while Monge & Contractor (2003) underscore 5 levels (single actor, dyad, triad, sub-group, global). These differences are due to the fact that the complex system cannot be defined in a *natural-objective* way, because there are not hierarchical *natural-objective* relations among systems, sub-systems and supra-systems. Every system can be a sub-system and a supra-system at the same time.

Complex systems have "*tangled composite*" structures, inside which it is possible to outline several levels of analysis. At these levels, a number of semi-autonomous processes take place in order to improve the pay-offs of the participants. At the same time, these levels co-evolve interacting with other levels of the system. As Anderson (1999, p.223) points out: «*Agents (and clusters of agents that form stable subsystems) coevolve with one another, because changes in the distribution of behaviors among agents change individual fitness functions, and such shifts in turn alter behaviors*».

In order to identify the levels of analysis and to draw an exhaustive description of the inter-firm network, it is necessary to focus on the connective architecture of the organization. This architecture is formed by the set of interrelated systemic relations. In this context, relations have different degrees of force, and dyadic or multiple significance. In the network's architecture it is possible to spot different interconnected areas of strong interaction (cluster of firms) among firm-agents. These clusters of firms show emerging properties, self-organizing capabilities, a certain degree of autonomy; it can be considered a *meso-system* (Levanti, 2010). On the other hand, systemic firms and firms' clusters are connected by a set of weak links (both direct and indirect); this is the *macro-system* level.

Hence, in an inter-firm network system we can highlight three levels. These levels are distinct but complementary and coexisting. They are:

− *micro-systemic:* regards the single firms;

− *meso-systemic:* considers the different sets of firms connected among them with strong links (firms' clusters);

− *macro-systemic:* involves the whole network system.

Each of these levels acts a different role in the inter-organization network, interacts with other levels and coevolves with them.

5. CST as a dynamic approach to the analysis of inter-firm networks.

CST analyzes inter-firm networks not just statically but with a dynamic approach. This theory overtakes the limit of Social Network Analysis that is to consider only the structure of the network.

In the analysis of economic systems, process based and dynamic approaches diverge from static and structural ones in consideration of the different concept of time they imply. The former are based on a *Newtonian* time concept, according to which time is "causally inert"; in other words, time can flow without any event happening and without any learning process taking place. The latter are founded on the "*real time*" concept, which implies that temporal dimension assumes causal power (O'Driscoll & Rizzo, 1985). Economic agents (firms, clusters of firms, networks, etc.) acquire and gather experiences through action. This learning process causes an increase of the stock of knowledge and a change of the way of computing information. Economic agents modify their plans for future actions according to the new knowledge and perspectives; doing so they generate *endogenous uncertainty*.

This uncertainty creates inside economic processes the space necessary for "surprise". In other words the economic process is "dynamic" and goes on through trials and errors leading to the discovery of new opportunities that otherwise wouldn't be noticed. Indeed, the dynamic nature of the system is not subject to any limitation of knowledge expansion, so that, in the middle-long term, the system can grow thanks to the learning of each agent. Agents assume a pro-active role, defining and redefining the finalities of the system on the basis of their ability to foresee future events. Firm agents try, in this way, to anticipate the possible future evolutions of the system, which, at the time they formulate their expectations, are not rationally inferable by the actual circumstances (Mocciaro Li Destri & Dagnino, 2005). Interactions can also self-generate spontaneously, at different systemic levels, without being planned by a central authority. The system automatically produces macro-order through micro-processes and meso-processes involving action, interaction and causal feed-back (Chiles et al., 2004).

Hence CST has a dynamic approach to organizational change (Mohr, 1982; Van de Ven & Huber, 1990; Langley, 1999; Van de Ven & Poole, 2002). Changes taking place at the three different systemic levels generate, and are generated by, both direct interaction among networked firms and indirect *feed-back* and *feed-forward* (Lewin & Volberda, 1999). In other words, the complex recursive interactions coming from the interdependencies and from *mutual causality* among the three levels, reduce the importance of the distinction between dependant and independent variables; this because changes of each variable can be determined endogenously by changes in other variables.

On the basis of what we said, it is possible to assert that, in an inter-firm network system, the viable motion of interactions, feed-backs, feed-forwards, emergences, purposes and conflicts among firms and/or clusters of firms, defines and redefines, continuously, both the connective structure of the organization and the firm behaviors in the three systemic levels. This implies that these behaviors cannot be forecasted or deduced deterministically. The shift from a static to a dynamic paradigm leads to consider systemic complexity as a source of business opportunities for networked firms. In particular the connective architecture of the system and the strategies pursued at the three systemic levels, can enhance the efficiency, the effectiveness and the speed (synchronically and diachronically) of the inner processes of the networked firms (Levanti, 2010).

6. Conclusions

Our analysis pointed out the advantages of interpreting inter-firm networks according to the Complex System Theory (CST). These advantages are:

a)   The overtaking of the limits of both *holistic* and *analytic reductionist* approaches. This is possible because CST adopt a logic that is, at the same time holistic and multi-level. Analyzing inter-firm network with a CST methodology it is possible to focus simultaneously both on synergies and on emerging properties. These synergies and emergencies stem at macro-systemic level from the interactions among different and idiosyncratic firms (micro-systemic level) and clusters of firms (meso-systemic level).

b)   The shift from a static to a dynamic approach. The complex interactions succeeding through time, in the inter-firm network, define and redefine continuously both the network's connective structure and the individual and collective behaviors in the three systemic levels.

The limit of CST perspective is that it doesn't underscore the objectives of single firms or clusters. The CST explains the characteristics, the structures and the evolutionary paths of complex systems, but does not consider the specific nature of systems. Hence when we need to analyze a particular category of systems we need to integrate CST with other theories which are more specific regard the class of systems we have to investigate.

For this reason, in order to highlight the determinant factors underlying the behaviors of firms inside the inter-firm network, it is necessary to integrate CST with other managerial theories. Further research would be useful to

investigate, for example, how CST can be completed by the recent advances in Knowledge Based Theory.

References

Anderson, P. (1999). Complexity Theory and Organization Science, *Organization Science*, 10 (3): 216-232. doi:10.1287/orsc.10.3.216.

Arthur, W. B. (1989). Competing Technologies, Increasing Returns, and Lock-in by Historical Events, *Economic Journal,* 99: 116-131. doi:10.2307/2234208, http://dx.doi.org/10.2307/2234208.

Axeldrod, R. (1997). The Complexity of Cooperation. N.J: Princeton University Press.

Axeldrod ,R. & Cohen, M.D. (2000). Harnessing Complexity: Organizational Implications of a Scientific Frontier. NY: Basic Books.

Baum, J. A. C. (1999). Whole-part Coevolutionary Competition in Organizations, in Baum J. A. C. & McKelvey B. (eds.). Variatiion in Organization Science: in Honor of Donald T. Campbell. London: SAGE, pp. 113-135.

Baum J.A.C. & Singh J. V. (1994). Organizational Hierarchies and Evolutionary Processes: Some Reflections on a Theory of Organizational Evolution, in Baum J.A.C., Singh J. V. (eds.). Evolutionary Dynamics of Organizations, NY: Oxford University Press, pp.3-20.

Bertelè U. (1994). Sistemi di imprese e differenziali produttivi, in Dioguardi G (ed.). Sistemi di imprese. Le nuove configurazioni dell'impresa e dei mercati. Milan: Etas.

Bertschinger N., Olbrich E., Ay N. & Jost J. (2006). Information and Closure in Systems Theory, in Explorations in the Complexity of Possible Life, Artmann S. & Dittrich P. (eds.), Amsterdam: IOS Press.

Bocchi G. & Ceruti M. (1985). La sfida della complessità. Milan: Feltrinelli.

Capra, F. (1996). The Web of Life. 1st Anchor Books.

Ceruti M. (1992). Presentazione: per una storia naturale della conoscenza, in Maturana H. & Varela F., L'albero della conoscenza. Milan: Garzanti.

Chiles T. H., Meyer A. D., Hench T. J. (2004). Organizational Emergence: The Origin and Transformation of Branson, Missouri's Musical Theaters, *Organization Science*, 15 (5): 499-519. doi:10.1287/orsc.1040.0095, http://dx.doi.org/10.1287/orsc.1040.0095.

Cohen M.D. (1999). Commentary on the Organization Science Special Issue on Complexity, *Organization Science*, 10 (3): 373-376. doi:10.1287/orsc.10.3.373, http://dx.doi.org/10.1287/orsc.10.3.373.

Dagnino G. B. (2000). Conoscenza, complessità e sistemi d'imprese. Turin: Giappichelli.

Dagnino G. B. (2004). Complex Systems as Key Drivers for the Emergence of a Resource and Capability-Based Interorganizational Network", *Emerge: Complexity and Organization*, 6 (1-2): 61-69.

Di Bernardo B. & Rullani E. (1990). Il management e le macchine. Teoria evolutiva dell'impresa. Bologna: Il Mulino.

Dominici G. (2008). Holonic Production System to obtain flexibility for Customer Satisfaction, *Journal of Service Science and Management,* 1 (3): 251-254. doi:10.4236/jssm.2008.13027, http://dx.doi.org/10.4236/jssm.2008.13027 .

Fontana W. & Ballati S. (1999). Complexity, *Complexity*, 4 (3): 14-16. doi:10.1002/(SICI)1099-0526(199901/02)4:3<14::AID-CPLX3>3.0.CO;2-O.

Forrester J. W. (1968) Principles of Systems. Cambridge, MA: Wright-Allen Press.

Gleick J. (1987). Chaos: Making a New Science. NY: Penguin.

Golinelli G.M. (2010). Viable Systems Approach (VSA). Governing business dynamics. Padua: CEDAM.

Kauffman S. A. (1993). The Origins of Order: Self-organization and Selection in Evolution. NY: Oxford University Press.

Kontopoulos K. M. (1993). The logics of Social Structure. NY: Cambridge University Press.

Langley A. (1999). Strategies for Theorizing from Process Data, *Academy of Management Review*, 24 (4): 691-710. doi:10.2307/259349, http://dx.doi.org/10.2307/259349 .

Levanti G. (2010). Il governo dei sistemi reticolari di imprese. Milan: FrancoAngeli.

Lewin A. Y. (1999). Application of Complexity Theory to Organization Science, *Organization Science* 10 (3): 215-223. doi:10.1287/orsc.10.3.215, http://dx.doi.org/10.1287/orsc.10.3.215.

Lewin A. Y. & Volberda H. W. (1999). Prolegomena on Coevolution: A Framework for Research on Strategy and

New Organizational Forms", *Organization Science*, 10 (5): 519-534. doi:10.1287/orsc.10.5.519, http://dx.doi.org/10.1287/orsc.10.5.519 .

Maturana H. & Varela F. (1984). El Arbol del Conocimiento. Las Bases Biologicas del Entendimiento Humano. Santiago: Editorial Universitaria.

McCarthy I. P., Rakotobe-Joel T., Frizelle G. (2000). Complex systems theory: implications and promises for manufacturing organizations, *International Journal of Manufacturing Technology and Management*, 2, (1−7): 559-579.

McKelvey B. (1997). Quasi-natural Organization Science, *Organization Science*, 8 (4): 352-380. doi:10.1287/orsc.8.4.351, http://dx.doi.org/10.1287/orsc.8.4.351

McKelvey B. (1999). Avoiding Complexity Catastrophe in Coevolutionary Pockets: Strategies of Rugged Landscapes, *Organization Science*, 10 (3): 294-321. doi:10.1287/orsc.10.3.294.

Mocciaro Li Destri A. & Dagnino G. B. (2005). The Resource-Based Firm Between Value Creation and Value Appropriation", *Advances in Strategic Management*, 22:153-188. doi:10.1016/S0742-3322(05)22006-5, http://dx.doi.org/10.1016/S0742-3322(05)22006-5 .

Mohr L. B. (1982). Explaining Organizational Behavior. San Francisco: Jossey-Bass.

Monge P. R. & Contractor N. S. (2003). Theories of Communication Networks. NY: Oxford University Press.

Morin E. (1985). Le vie della complessità, in Bocchi G & Ceruti M. (eds.), La sfida della complessità. Milan: Feltrinelli.

Morin E. (1977). La Méthode, tome I: la nature de la nature. Paris : Editions du Seuil.

Nicolis G. & Prigogine I. (1987). Exploring Complexity. An Introduction. Munich: Piper.

O'Driscoll G.P. & Rizzo M. J. (1985). The Economics of Time and Ignorance. Oxford: Basil Blackwell.

Prigogine I., Stengers I., 1979, *La Nouvelle Alliance. Metamorphose de la Science*, Gallimard, Paris.

Prigogine I. & Stengers I. (1984). Order Out of Chaos: Man's New Dialogue with Nature. NY: Bantam Books.

Sherman, H. & Shultz, R. (1998). Open Boundaries: Creating Business Innovation through Complexity. MA: Perseus Books.

Smarr L. (1985). An approach to complexity: numerical computations. *Science*, 228:403–408. doi:10.1126/science.228.4698.403 PMid:17746870, http://dx.doi.org/10.1126/science.228.4698.403 .

Stacey R. D. (1995). The Science of Complexity: An Alternative Perspective for Strategic Changed Processes", *Strategic Management Journal*, 16: 477-495. doi:10.1002/smj.4250160606, http://dx.doi.org/10.1002/smj.4250160606 .

Stafford Beer A. (1972). Brain of the Firm. London: The Penguin Press.

Tagliagambe S & Usai G. (1994). L'impresa tra ipotesi, miti e realtà. Milan: ISEDI.

Van de Ven A. H. & Huber G. P. (1990). Longitudinal Field Research Methods for Studying Processes of Organizational Change", *Organization Science*, 1:213-219. doi:10.1287/orsc.1.3.213

Van de Ven A. H. & Poole m. S. (2002). Field Research Methods, in Baum J. A. C. (ed.), Companion to organizations. MA: Blackwell.

Vicari S. (1991). L'impresa vivente. Itinerario di una diversa concezione. Milan: Etas.

Volberda H. W. & Lewin A. Y. (2003). Co-evolutionary Dynamics Within and Between Firms: From Evolution to Co-evolution, *Journal of Management Studies*, 40 (8): 2111-2136. doi:10.1046/j.1467-6486.2003.00414.x, http://dx.doi.org/10.1046/j.1467-6486.2003.00414.x

Von Bertalanffy L. (1957). General system Theory, in Life, Language, Law: Essays in Honor of Arthur F. Bentley. Taylor R. W., (ed.). Yellow Springs, OH: Antioch Press.

Waldrop W. M. (1992). Complexity: The Emerging Science at the Edge of Order and Chaos, NY: Touchstone.

Wiener, N. (1948). Cybernetics or Control and Communications in the Animal and theMachine, Cambridge, Massachusetts: Technology Press.

Notes

Note 1. According to Italian regulation on scientific publishing we declare that prof. Gandolfo Dominici contributed mainly to paragraph 1, 2 and 3 and Dr. Gabriella Levanti contributed mainly to paragraphs 4,5 and 6.

Note 2. From the Greek κυβερνήτης (kybernētēs) with the meaning of: governor, pilot, rudder.

Causal Latent Semantic Analysis (cLSA): An Illustration

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Abstract

Latent semantic analysis (LSA), a mathematical and statistical technique, is used to uncover latent semantic structure within a text corpus. It is a methodology that can extract the contextual-usage meaning of words and obtain approximate estimates of meaning similarities among words and text passages. While LSA has a plethora of applications such as natural language processing and library indexing, it lacks the ability to validate models that possess interrelations and/or causal relationships between constructs. The objective of this study is to develop a modified latent semantic analysis called the causal latent semantic analysis (cLSA) that can be used both to uncover the latent semantic factors and to establish causal relationships among these factors. The cLSA methodology illustrated in this study will provide academicians with a new approach to test causal models based on quantitative analysis of the textual data. The managerial implication of this study is that managers can get an aggregated understanding of their business models because the cLSA methodology provides a validation of them based on anecdotal evidence.

Keywords: Causal latent semantic analysis, CLSA, Latent semantic analysis, LSA

1. Introduction

Latent semantic analysis (LSA) is both a theory and a method that extracts the contextual-usage meaning of words and obtains approximate estimates of meaning similarities among words and text segments in a large corpus (Landauer *et al.*, 1998). It uses mathematical and statistical techniques to derive the latent semantic structure within a text corpus (Berry, 1992; Deerwester *et al.*, 1990). The text corpus comprises of documents that include text passages, essays, research paper abstracts, or other contexts such as customer comments, interview transcripts, etc. LSA has a plethora of applications. It improves library indexing methods and the performance of search engine queries (Berry et al. 1995; Deerwester *et al.*, 1990; Dumais, 2004). Psychology researchers use LSA to explain natural language processing such as word sorting and category judgments (Landauer, 2002). LSA in combination with document clustering was used on titles and keywords of articles published in 25 animal behavior journals in 1968-2002 (Ord *et al.*, 2005) to produce lists of terms associated with each research theme. The same method was used on titles, abstracts, and full body text of articles published in the *Proceedings of the National Academy of Science* in 1997-2002 to produce visualization clusters projected on 3 dimensions (Landauer *et al.*, 2004).

Latent Semantic Analysis (LSA) is a methodology akin to Factor Analysis, but applicable to text data, that was introduced in the early 90s. LSA aimed to improve library indexing methods and the performance of search engine queries (Deerwester *et al.*, 1990; Berry *et al.*, 1995; Dumais, 2004). Direct interpretation of the latent semantic

factors was never attempted, because the role of the factor space was merely to assist with the investigation of the relationships among text documents. Therefore, LSA lacks the ability to validate models that possess interrelations and/or causal relationships between constructs. In this study, we attempt to fill that void by developing a new approach based on the traditional LSA that will help researchers test causal models based on quantitative analysis of the textual data. Thus, our objective is to illustrate how a modified latent semantic analysis called the causal latent semantic analysis (cLSA) allows uncovering the latent semantic factors and establishing causal relationships among these factors.

The rest of the paper is organized as follows: a brief description of the major steps of LSA is provided followed by an illustration of LSA, a discussion of causal latent semantic analysis (cLSA), and an illustration of cLSA. Finally, we present the conclusions, limitations, and future direction of the study.

2. Latent Semantic Analysis

The major steps involved in LSA are given below.

First, the text corpus is represented as a term-by-document matrix **X**, in which the rows and the columns stand for unique words and unique documents, respectively. Each cell of matrix X contains the frequency of the word denoted by its row in the document denoted by its column. Figure 1shows the schematic of matrix X.

Second, cell frequencies are transformed (weighted) by using some function. Various transformation schemes can be used in weighting the cell frequencies. For instance, the log-entropy transformation method converts each cell frequency (+1) to its log, computes the entropy of each word $(\sum p \log p)$ over all entries in its row, and then divides each cell entry by the row entropy value. The columns of the transformed matrix are usually normalized so the final X matrix is represented in terms of vector space model (VSM). The purpose of the transformation is to show a word's importance in a particular document and the degree to which it carries information in the domain of discourse in general (Landauer *et al.*, 1998).

Third, Singular value decomposition (SVD) is applied to the X matrix. Using SVD, the rectangular $t \times d$ matrix X with rank $r \leq \min(t, d)$ is decomposed into the product of three matrices such that $X = TSD^T$. Matrix **T** is the $t \times r$ matrix of term eigenvectors of the square symmetric matrix $Y = XX^T$ where **Y** is the $t \times t$ matrix of term covariances. Its columns are called the left singular vectors, which are orthonormal (i.e., $T^T T = I$ where **I** is an $r \times r$ identity matrix). Matrix **D** is the $d \times r$ matrix of document eigenvectors of the square symmetric matrix $Z = X^T X$ where **Z** is the $d \times d$ matrix of document covariances. The columns of matrix **D** are called the right singular vectors, which are also orthonormal (i.e., $D^T D = I$ where **I** is an $r \times r$ identity matrix). Thus, $T^T T = D^T D = I$. Matrix **S** is the $r \times r$ diagonal matrix of singular values. These singular values are the square roots of eigenvalues of both **Y** and **Z**.

In general, the matrices T, S, and D are of full rank for $X = TSD^T$. Given $rank(X) = r \leq \min(t, d)$, the matrices T, S, and D each will have a $rank(T) = rank(S) = rank(D) = r$. Therefore, an SVD of the $t \times d$ matrix of terms by documents results in the *r* number of dimensions. For $d \leq t$, this means that each document represents a unique dimension in the domain of discourse. Similarly, for $t \leq d$, this means that each term represents a unique dimension in the domain of discourse.

However, the $t \times d$ term-by-document matrix X can be decomposed using fewer than the *r* number of factors, and the reconstructed matrix $\hat{X}$ becomes a least-squares best fit of matrix X (Deerwester *et al.*, 1990; Landauer *et al.*, 1998). The fundamental idea behind using fewer than the necessary number of factors is that the $t \times d$ matrix X can be approximated by $\hat{X} = TS_0 D^T$, where C is the diagonal matrix S with the first *k* largest original singular values and the remaining (*r-k*) smaller singular values set to zero. The resulting matrix $\hat{X}$ is of rank *k* (k<r) and is the best approximation of **X** in the least squares sense. The variability of **X** is now explained by the first **k** factors and is equal to the sum of these **k** squared singular values. The diagonal matrix S_0 can be simplified to the $k \times k$ diagonal matrix $\hat{S}$ by deleting the rows and columns of S_0 containing zeros. The corresponding columns of matrices T and D must also be deleted, resulting in the $t \times k$ matrix $\hat{T}$ and the $d \times k$ matrix $\hat{D}$, respectively. Thus, we obtain the rank-*k* reduced model, $\hat{X} = \hat{T}\hat{S}\hat{D}^T$, which is the best possible least-squares-fit to **X**. This truncated representation of the original structure using only the significant factors reduces synonymy and polysemy

effects, and was shown to drastically improve query performance (Landauer *et al*., 1998; Landauer, 2002).

The choice of *k* is critical in LSA. Small number of dimensions can be used to detect local unique components. On the other hand, large number of dimensions can capture similarities and differences. The selection of k can be dealt with empirically. Deerwester *et al*. (1990) suggest 70 to 100 dimensions frequently being the optimal choice for collections of about 5,000 terms by 1,000 documents. Efron (2005) selects *k* based on non-parametric confidence intervals obtained through simulations and bootstrapping. Interestingly, for collections of similar size, his method selects *k* values in the range of 80 to 100. Other classic *k* selection approaches include the total variance explained method (the number of components that explain 85% of total variance) and the Kaiser-Guttman rule (keeping components whose eigenvalues are greater than $\bar{\lambda}$) (Kaiser, 1958).

LSA provides term and factor representation in the same factor space. From truncated SVD of matrix X, $\hat{X} = \hat{T}\hat{S}\hat{D}^T$, the term and document variance-covariance matrices are given by $\hat{X}\hat{X}^T$ and $\hat{X}^T\hat{X}$, respectively. We see that the term variance-covariance matrix $\hat{X}\hat{X}^T$ is reproduced as $\hat{X}\hat{X}^T = \hat{T}\hat{S}(\hat{T}\hat{S})^T$, therefore, $L_T = \hat{T}\hat{S} = \hat{X}\hat{D}$ is a matrix of factor loadings for terms. Similarly, the factor loadings for the documents are given by $L_D = \hat{D}\hat{S} = \hat{X}^T\hat{T}$. Since both the terms and documents are represented in the same factor space, LSA also provides matrix expressions that allow comparison of terms and documents with each other.

3. Illustration of Latent Semantic Analysis (LSA)

The corpus consists of a collection of seven select article titles published in volume 10 issues 2/3 and 4 of the *International Journal of Business Performance Management* (IJBPM) in 2008. Table 1 presents the list of these article titles and their reference to IJBPM.

3.1 Data Cleaning

The data were subjected to a data cleaning process, in which (1) the hyphens in *key-variables* in *R2* and in *1980*-200 in *P2* were removed and a space was used to separate the words, and (2) the colons in P1 and p2 were removed. Note that the data cleaning process may vary from corpus to corpus and based on the LSA automation algorithm. In this illustration, we consider the use of a space to separate the words. Therefore, the above data cleaning method is deemed appropriate. Table 2 presents the corpus after the cleaning process.

3.2 Dictionary of Relevant Terms

The initial dictionary comprises of 70 words, of which 40 words appear only in one document. The elimination of these unique words reduces the dictionary size to 30 words. We then remove the stopwords such as 'a', 'an', 'for', 'of', 'the', etc. from the dictionary. The list of stopwords consists of the standard 571 common words developed by the System for the Mechanical Analysis and Retrieval of Text (SMART) at Cornell University (Salton and Buckley, 1988). The removal of stopwords from the dictionary reduces its size to 15 words. The dictionary, therefore, consists of 15 relevant words. These words are italicized and boldfaced in Table 2. There are only 5 unique words (i.e., terms) in the dictionary of relevant words: *analysis, growth, model, productivity,* and *risk*.

3.3 The Term-by-Document Matrix X

The term-by-document matrix X developed from the dictionary of relevant words is shown in Table 3. The rows of matrix X represent the terms and the columns of matrix X represent the documents. Since there are five terms and seven documents, matrix X is a 5×7 rectangular matrix. Table 3 shows matrix X containing the raw term frequencies for each of the seven documents.

3.4 Transformation of X

The raw frequencies were transformed by using the traditional TF-IDF (term frequency – inverse document frequency) weighting method (Han and Kamber, 2006, p. 619). In the TF-IDF scheme, each raw frequency, f_{td}, is replaced with its corresponding $w_{td} = f_{td} \times idf_{td}$, where f_{td} is the raw term frequency of term t in document d, $idf_{td} = \log_2(N/n_t)$, N is the number od documents in the corpus, and n_t is the number of documents containing term t. The weighted frequencies were then normalized so that $\sum w_{td}^2 = 1$ for each document d. Table 4 shows the transformed X matrix.

3.5 Singular Value Decomposition (SVD) of X

Singular value decomposition was applied to matrix X in Table 4. Matrix X is of rank 5. The SVD of X is given by $X = TSD^T$, where **T** is the 5×5 matrix of term eigenvectors of the square symmetric matrix $Y = XX^T$, **Y** is the 5×5 matrix of term covariances, **D** is the 5×7 matrix of document eigenvectors of the square symmetric matrix $Z = X^TX$, **Z** is the 7×7 matrix of document covariances, and **S** is the 5×5 diagonal matrix of singular values (i.e.,

the square roots of eigenvalues of both **Y** and **Z**). The SVD of X was performed using an online SVD calculator available at http://www.bluebit.gr/matrix-calculator/ and is shown in Figure 2.

3.6 Reduction of Factors

The rank-*k* reduced model $\hat{X} = \hat{T}\hat{S}\hat{D}^T$ is the best possible least-squares-fit to **X**. In this illustration, we selected *k* based on the Kaiser-Guttman rule, which suggests that we keep the factors whose eigenvalues are greater than $\bar{\lambda}$. The diagonal matrix **S** contains the singular values s_i = {1.678, 1.542, 1.067, 0.790, and 0.209}. The corresponding eigenvalues are λ_i = s_i^2 = {1.295, 1.242, 1.033, 0.889, and 0.457}. Therefore, $\bar{\lambda}$ = 1.40 and the Kaiser-Guttman rule suggests keeping the first two principal factors. The reduced model $\hat{X} = \hat{T}\hat{S}\hat{D}^T$ with *k* = 2 is shown in Figure 3.

3.7 Rotation of Factors

The term and document loadings are given by $L_T = \hat{T}\hat{S}$ and $L_D = \hat{D}\hat{S}$, respectively. Rotations of factors can then be performed to simplify the factor structure and factor interpretations (Sidorova *et al*., 2008; Thurstone, 1947). Here we used varimax rotation for both term loadings and document loading to maintain the same factor space. Varimax rotation simplifies the interpretation of factors because, after varimax rotation, each term and/or document tends to be associated with one or a small number of factors, and vice versa (Kaiser, 1958). To obtain the varimax rotated factor matrices L_T^* and L_D^*, matrices L_T and L_D were multiplied by their corresponding orthogonal varimax transformation matrices M_T and M_D. The matrices M_T and M_D were obtained from MINITAB 15 by using L_T and L_D, respectively. The term loadings before and after varimax rotation are shown in Table 5. Table 6 shows the document loadings before and after varimax rotation.

3.8 Interpretation of Factors

As Table 5 and Table 6 indicate, Factor 1 appears to be highly related to the terms {*analysis*, *model*, and *risk*}, and loads strongly on documents R1, R2, R3, and R4. Factor 2 appears to be primarily related to the terms {*growth*, and *productivity*}, and loads strongly on documents P1, P2, and P3. Reading the corresponding titles from Table 1, it is plausible to infer that Factor 1 is about Analysis of Risk Models and factor 2 is about Growth and Productivity.

4. Causal Latent Semantic Analysis (cLSA)

The causal LSA (cLSA) is a modification and thus a derivative of the traditional latent semantic analysis. In addition to uncovering the latent factors, the cLSA establishes causal relationships among these factors based on the input and output statements contained in the factors. The cLSA performs LSA on a corpus comprised of input and output statements obtained from text passages. An input-output statement (also, called XY statement) is defined as a pair of statements in which the output statement (the Y statement) is a consequence of the input statement (the X statement). For instance, consider the statement: "Companies must have the necessary organizational structure in order to improve the day-to-day management of their business". Here the output statement "companies improve the day-to-day management of their business" is considered to be a direct consequence of the input statement "companies must have the necessary organizational structure". An output statement may be a consequence of one or more input statements and an input statement may influence one or more output statements. In "a company must know its sources of profit and understand its cost structure in order to become competitive", the output statement "a company becomes competitive" is a consequence of two input statements – "a company must know its sources of profit", and "a company must understand its cost structure". A generic coding scheme to obtain the input-output statements from text passages is provided in Table 7. Once we obtain a corpus comprising of input-output statements, we can apply the following cLSA methodology both to uncover the latent semantic constructs and to establish causal relationships among them.

5. Illustration of cLSA

In order to illustrate the cLSA methodology, let's consider the following two short passages:

Passage 1: *The implementation of a BPM solution will most definitely generate returns in the form of improved processes* (Ginsberg, 2004).

Passage 2: *An effective BPM solution will make better, more timely decisions, and identify where business processes need to be improved or changed* (Simms, 2004).

Before we detail the steps of cLSA, let's assume that a knowledgeable researcher is asked to identify the potential factors and their relationships from this set of input-output statements. It is likely that the researcher will recognize and identify three factors – bpm solution/implementation, business processes, and timely decision – and conclude

the relationships between the factors as shown in Figure 4.

Using the coding scheme (Table 7), we can develop the input-output pairs as presented in Table 8. From the first passage, Ginberg (2004), we obtained one input statement that corresponds to one output statement. However, from the second passage, Simms (2004), we have had one input statement that corresponds to two output statements. In this example, we use these three input-output pairs to develop our corpus for the cLSA.

The corpus for cLSA consists of the input and output statements obtained from text passages. These text passages may include article abstracts, customer comments, discussion sections of articles, or simply text documents. The input and output statements are referred to as the X and Y statements, respectively. Each XY statement pair is assigned an XStatementID and an YStatementID in order to track the correspondence between the statements. If an X statement corresponds to more than one Y statement, then the X statement is given only one XStatementID and the corresponding Y statements are given separate YStatementIDs. Similarly, if a Y statement corresponds to more than one X statement, then the Y statement is given only one YStatementID and the corresponding X statements are given separate XStatementIDs. For instance, in Table 8, the X statement *an effective bpm solution* with an XStatementID *Simms 2004 X1* has two corresponding Y statements – *will make better, more timely decisions* with an YStatementID *Simms 2004 Y1*, and *will identify where business processes need to be improved or changed* with an YStatementID *Simms 2004 Y2*. Assigning statement IDs in such a manner helps not only to track the XY correspondence but also to eliminate duplicate use of statements in the corpus.

To develop the corpus, first, the X statements are combined with the Y statements. Then the duplicate X and/or Y statements are removed. Finally, the unique statements are sorted by StatementID to form the corpus for LSA. The combined statements from Table 8 are shown in Table 9. Table 10 presents the final corpus.

It is now possible to perform LSA on the corpus to extract the latent semantic structure. For stepwise illustration of LSA, refer to Sidorova *et al*. (2008) and Section 3 above. The corpus consists of a collection of five statements with 30 words. Due to the small size of the corpus, we used the removal of stopwords and term stemming as the only term filtering techniques. Note that for large corpuses, other term filtering techniques such as the elimination of unique words (i.e., the words that appear in only one statement) and communality filtering can be applied. The removal of stopwords such as *the*, *an*, *is*, *are*, etc. and the Porter term stemming (Porter, 1980) produced a dictionary of 9 relevant terms. Table 11 shows matrix X containing the term frequencies. Matrix X with the TF-IDF (term frequency – inverse document frequency) weighted normalized frequencies is presented in Table 12.

Singular value decomposition (SVD) was applied to matrix X in Table 12. Keeping the first three principal components, the SVD of matrix X, $X = TSD^T$, produced a 9×3 matrix T of term eigenvectors of the square symmetric matrix XX^T, a 5×3 matrix D of statement eigenvectors of the square symmetric matrix $X^T X$, and a 3×3 diagonal matrix $\hat{S}$ of singular values. The term and statement loadings were obtained by $L_T = TS$ and $L_D = DS$, respectively. Rotations of factors were then performed to simplify the factor structure and factor interpretations (Sidorova *et al*. 2008). We used varimax rotation for both term loadings and statement loading to maintain the same factor space. The term loadings before and after varimax rotation are shown in Table 13. Table 14 shows the statement loadings before and after varimax rotation.

As Table 13 and Table 14 indicate, Factor F1 appears to be highly related to the terms {*bpm, solution, effective,* and *implementation*}, and loads strongly on statements {*Ginsberg 2004 X1*, and *Simms 2004 X1*}. Factor F2 appears to be primarily related to the terms {*business, processes,* and *returns*}, and loads strongly on statements {*Ginsberg 2004* Y1 and *Simms 2004 Y2*}. The terms and statements loading highly on Factor F3 are {*decision* and *timely*} and {*Simms 2004 Y1*}, respectively. Examination of the statements loading in the factors Table 10 reveals that these factors are what the knowledgeable researcher dubbed them earlier.

In cLSA, the X statements and their factor associations from Statement Loadings Matrix (Table 14) are tallied with the corresponding Y statements and their factor associations to determine inter-factor statement frequencies. The factor associations of a statement are determined by the factor loadings of the statement. If a statement has a factor loading of more than zero in a factor, then the statement is said to have an association with that factor. This will yield an $f \times f$ matrix F of inter-factor statement frequencies, where *f* denotes the number of factors. The cell frequencies of a factor with relation to others provide support for that factor leading to those other factors. In this example, we considered a three-factor LSA. Therefore, we will obtain a 3×3 matrix F of inter-factor statement frequencies. The process of obtaining an inter-factor statement frequency matrix is described in the following.

Step 1: The statement loadings (Table 14) are separated into X statement loadings and Y statement loadings. The separated X and Y statement loadings for Table 14 are provided in Table 15 and Table 16, respectively.

Step 2: Each X statement is taken at a time and its factor associations are noted. These factor associations are called the X factor associations or the independent factor associations. For instance, the first X statement *Ginsberg 2004 X1* is associated with Factor F1. Therefore, for this statement, Factor F1 acts as an independent factor.

Step 3: The corresponding Y statement(s) of the X statement in Step 2 are determined based on the XY statement pairs (Table 8). For instance, Table 8 indicates that the corresponding Y statement(s) of *Ginsberg 2004 X1* is *Ginsberg 2004 Y1*.

Step 4: The factor associations of each Y statement in Step 3 are noted. These factor associations are called the Y factor associations or the dependent factor associations. The Y statement *Ginsberg 2004 Y1* is associated with Factor F2. Therefore, for this statement, Factor F2 is a dependent factor.

Step 5: Each X factor association is tallied with all of its corresponding Y factor associations. A tally of an X factor association with a Y factor association provides an entry to the cell of the $f \times f$ matrix F located at the intersection of the X factor and the Y factor. A cell entry of 1 indicates that there is one support for the X factor leading to the Y factor. For *Ginsberg 2004 X1 - Ginsberg 2004 Y1* pair, the X factor is Factor F1 (Step 2) and the corresponding Y factor is Factor F2 (Step 4). By using X factors as the column headers and the Y factors as the row headers, this indicates that there will be a cell entry of 1 at the intersection column 1 and row 2. Figure 5(a) shows the schematic view of the inter-factor association of the *Ginsberg 2004 X1 - Ginsberg 2004 Y1* pair. Table 17 presents the corresponding cell entry into matrix F.

Step 6: Steps 2 thru 5 are repeated until all X statements (Table 15) are exhausted. Figure 5(b) provides the schematic view of the inter-factor associations of the *Simms 2004 X1*. The corresponding Y statements of *Simms 2004 X1* are *Simms 2004 Y1* and *Simms 2004 Y2*.

The cell frequencies of matrix F are of critical importance. They provide the strength of association between the independent factors and the dependent factors. The percentages that the cell frequencies account for can be used to compare two or more relationships among the factors. Various statistics can be developed using matrix F. Two of these statistics are the X-index and the Y-index. An X-index relates to an X factor and is the sum of the cell frequencies of the column that the factor represents. On the other hand, a Y-index relates to a Y factor and is the sum of the cell frequencies of the row that the factor represents. For example, the X-index for F1 as an independent factor is 3; the X-index for F2 as an independent factor is 0; and the X-index for F3 as an independent factor is 0. On the contrary, the Y-index for F1 as a dependent factor is 0; the Y-index for F2 as a dependent factor is 2; and the Y-index for F3 as a dependent factor is 1. Yet another statistic is the X – Y differential. These statistics are shown in Table 18.

While the X-index of a factor represents the overall impact of the factor as an independent factor, the Y-index shows the overall effect on the factor as a dependent factor. The X – Y differential can be used to decide whether a factor is a net independent or dependent factor. Table 18 indicates that F1 is a net independent factor, and both F2 and F3 are net dependent factors. These statistics along with cell frequencies can be expressed as percentages for better comparison purposes. Table 19 presents these percentages.

Based on the percentage measures in Table 19, the inter-factor relationships and their strength of associations are portrayed in Figure 6.

6. Conclusion, Limitations, and Future Direction

There are several theoretical and practical implications of this study. First, in this study, we developed a variant of the traditional LSA that enables us to test causal models using textual data. This study is the first that has attempted to develop the causal Latent Semantic Analysis (cLSA) that analyzes input-output statements to establish causal relationships between the factors derived from the analysis. The academic implication of this study is that it provides academicians with a new approach to test causal models based on quantitative analysis of the textual data. The managerial implication is that managers should get an aggregated understanding of the models because cLSA provides a validation of them based on anecdotal evidence.

Future works can extend this study in a number of ways and thus address some of the limitations that this study has. Future works can refine the method, especially, with regard to how to reduce the inter-factor causal relationships. This study developed an input-output (XY) coding scheme. This scheme is not comprehensive. Therefore, future studies can also refine and extend this coding scheme.

References

Berry, M. W. (1992). Large scale singular value computations. *International Journal of Supercomputer Applications*, *6*, 13-49.

Berry, M., Dumais, S., & O'Brien, G. (1995). Using linear algebra for intelligent information retrieval. *SIAM Review*, *37*(4), 573-595.

Deerwester, S., Dumais, S., Furnas, G., Landauer, T., & Harshman, R. (1990). Indexing by latent semantic analysis. *Journal of the American Society for Information Science, 41*(6), 391-407.

Dumais, S. (2004). Latent semantic analysis. *Annual Review of Information Science and Technology*, *38*, 189-230.

Efron, M. (2005). Eigenvalue-based model selection during latent semantic indexing. *Journal of the American Society for Information Science and Technology*, *56*(9), 969-988.

Ginsberg, A. D. (2004). Sarbanes-Oxley and BPM: Selecting software that will enhance compliance, *Business Performance Management*, October 1, 2004.

Han, J., and Kamber, M. (2006). *Data Mining: Concepts and Techniques*, 2nd ed., Morgan Kaufmann Publishers.

Kaiser, H.F. (1958). The varimax criterion for analytic rotation in factor analysis. *Psychometrika, 23*, 187-200.

Landauer, T. K. (2002). On the computational basis of learning and cognition: Arguments from LSA. In N. Ross (Ed.), *The psychology of learning and motivation, 41*, 43-84.

Landauer, T., Foltz, P., & Laham, D. (1998). Introduction to latent semantic analysis. *Discourse Processes*, *25*, 259-284.

Landauer, T., Laham, D. & Derr, M. (2004). From paragraph to graph: Latent semantic analysis for information visualization. *Proceedings of the National Academy of Sciences of the United States of America (PNAS), 101*, 5214-5219.

Ord, T., Martins, E., Thakur, S., Mane, K., & Börner, K. (2005). Trends in animal behaviour research (1968-2002): Ethoinformatics and the mining of library databases. *Animal Behaviour*, 69, 1399-1413.

Porter, M. (1980). An algorithm for suffix stripping. *Program*, *14*(3), 130–137.

Salton, G., and Buckley, C. (1988). Term-weighting approaches in automatic text retrieval. *Information Processing & Management, 24*(5), 513–523.

Sidorova, A., Evangelopoulos, N., Valacich, J., and Ramakrishnan, T. (2008). Uncovering the intellectual core of the information systems discipline. *MIS Quarterly*, *32*(3), 467-482.

Simms, E. (2004). Case study: United States sugar corporation. *Business Performance Management*, March 1, 2004.

Thurstone, L. L. (1947). *Multiple Factor Analysis,* Chicago, IL: University of Chicago Press.

Table 1. Titles of seven select articles published in IJBPM in 2008

ID	Document Title	IJBPM Reference
P1	Deregulation and productivity growth: a study of the Indian commercial banking industry	v. 10, p. 318 - 343
P2	Global productivity growth from 1980–2000: a regional view using the Malmquist total factor productivity index	v. 10, p. 374 - 390
P3	Measuring productivity under different incentive structures	v. 10, p. 366 - 373
R1	A rating model simulation for risk analysis	v. 10, p. 269 - 299
R2	An analysis of the key-variables of default risk using complex systems	v. 10, p. 202 - 230
R3	New contents and perspectives in the risk analysis of enterprises	v. 10, p. 136 - 173
R4	Risk insolvency predictive model maximum expected utility	v. 10, p. 174 - 190

Table 2. The corpus after the data cleaning process

ID	Document Title	IJBPM Reference
P1	Deregulation and ***productivity growth*** a study of the Indian commercial banking industry	v. 10, p. 318 - 343
P2	Global ***productivity growth*** from 1980 2000 a regional view using the Malmquist total factor ***productivity*** index	v. 10, p. 374 - 390
P3	Measuring ***productivity*** under different incentive structures	v. 10, p. 366 - 373
R1	A rating ***model*** simulation for ***risk analysis***	v. 10, p. 269 - 299
R2	An ***analysis*** of the key-variables of default ***risk*** using complex systems	v. 10, p. 202 - 230
R3	New contents and perspectives in the ***risk analysis*** of enterprises	v. 10, p. 136 - 173
R4	***Risk*** insolvency predictive ***model*** maximum expected utility	v. 10, p. 174 - 190

Table 3. Matrix X, containing term frequencies

Term	Document						
	P1	**P2**	**P3**	**R1**	**R2**	**R3**	**R4**
analysis	0	0	0	1	1	1	0
growth	1	1	0	0	0	0	0
model	0	0	0	1	0	0	1
productivity	1	2	1	0	0	0	0
risk	0	0	0	1	1	1	1

Table 4. Transformed matrix X (TF-IDF)

Term	Document						
	P1	**P2**	**P3**	**R1**	**R2**	**R3**	**R4**
analysis	0	0	0	0.525	0.834	0.834	0
growth	0.913	0.746	0	0	0	0	0
model	0	0	0	0.777	0	0	0.913
productivity	0.408	0.666	1	0	0	0	0
risk	0	0	0	0.347	0.551	0.551	0.408

Table 5. Term loadings before and after varimax rotation

	Term Loadings					
	Unrotated		**Orthogonal. Tran.**		**After varimax**	
Term	**Factor 1**	**Factor 2**	**Matrix (varimax)**		**Factor 1**	**Factor 2**
analysis	1.16	0			1.164	0
growth	0	-1.02	1.000	0.000	0	-1.02
model	0.78	0	×		0.776	0
productivity	0	-1.16	0.000	1.000	0	-1.16
risk	0.93	0			0.926	0

Table 6. Document loadings before and after varimax rotation

	Document Loadings					
	Unrotated		**Orthogonal. Tran.**		**After varimax**	
Document	**Factor 1**	**Factor 2**	**Matrix (varimax)**		**Factor 1**	**Factor 2**
P1	0	-0.91			0	-0.91
P2	0	-0.99	1.00	0.00	0	-0.993
P3	0	-0.75	×		0	-0.75
R1	0.92	0	0.00	1.00	0.92	0
R2	0.88	0			0.88	0
R3	0.88	0			0.88	0
R4	0.65	0			0.65	0

Table 7. Input-output statement (XY statement) coding scheme

Raw Statements	Input-Output Statements
In order to (verb) Y, X Or, X in order to (verb) Y *Companies must have the necessary organizational structure in order to improve the day-to-day management of their business*	Input: X Output: Subject of X (verb) Y Input: *companies must have the necessary organizational structure* Output: *companies improve the day-to-day management of their business*
By (verb particle) X, Y *By refocusing customer strategy, retooling measurement mechanics, and taking steps to realign the organization around customers, companies can retain and grow existing customers*	Input: Subject of Y (verb) X Output: Y Inputs: *(1) companies refocus customer strategy, (2) companies retool measurement mechanics, (3) companies take steps to realign the organization around customers* Output: *companies can retain and grow existing customers*
When X then Y *When an organization take a methodical approach to performance management, it becomes high-performance organization*	Input: X Output: Y Input: *an organization take a methodical approach to performance management* Output: *an organization becomes high-performance organization*
X (yields/ provides/ results in/ causes/ allows/ enables/ achieves/ guides/ ensures /brings /etc.) Y *Plans that are developed in a more collaborative environment yield more commitment from the people who have to bring them to fruition*	Input: X Output: Y Input: *plans are developed in a more collaborative environment* Output: *plans yield more commitment from the people who have to bring them to fruition*
If X, then Y *If companies do not provide exceptional customer service, customers will not renew their contracts*	Input: X Output: Y Input: *companies do not provide exceptional customer service* Output: *customers will not renew their contracts*
For X to (verb) Y, X (be) to (verb) Z *For BPM to provide the benefits that make it worth the investment, it has to focus on the right data*	Input: X (be) to (verb) Z Output: X (verb) Y Input: *BPM has to focus on the right data* Output: *BPM provides the benefits that make it worth the investment*
X because Y *Companies add OLAP technology to their BPM solution because they need to extract transaction information from all parts of their IT infrastructure*	Input: X Output: Y Input: *companies add OLAP technology to their BPM solution* Output: *companies need to extract transaction information from all parts of their IT infrastructure*
To (do) Y, (need) X *To integrate the data from the acquisition's IT systems into its BPM reporting framework, Logistics USA layers OLAP software on top of the acquired organization's disparate data sources*	Input: X Output: Y Input: *Logistics USA layers OLAP software on top of the acquired organization's disparate data sources* Output: *Logistics USA integrates the data from the acquisition's IT systems into its BPM reporting framework*
Y requires X Or X is required for Y *Establishing and sustaining a complexity management program requires dedicated resources and the involvement of the organization's top management*	Input: X Output: Y Input: *dedicated resources and the involvement of the organization's top management* Output: *establishing and sustaining a complexity management program*
X so as to Y *Maintenance should be managed better so as to cultivate a sense of ownership in the operators*	Input: X Output: Y Input: *maintenance should be managed better* Output: *cultivate a sense of ownership in the operators*
Because of X, Y *Because of the wide acclaim received by the Malcolm Baldrige Award, it has served as a model for national quality awards by many countries throughout the world*	Input: X Output: Y Input: *the wide acclaim received by the Malcolm Baldrige Award* Output: *it has served as a model for national quality awards by many countries throughout the world*
X is associated to/likely to create/etc. Y *Firms with higher amounts of intangible assets are more likely to create shareholder value*	Input: X Output: Y Input: *firms with higher amounts of intangible assets* Output: *create shareholder value*

Z uses X to improve/cause/enhance/etc. Y *faculty members have used the Criteria for Performance Excellence and the underlying concepts of the MBNQA to enhance the learning experiences of their students*	Input: X Output: Y Input: *the Criteria for Performance Excellence and the underlying concepts of the MBNQA* Output: *the learning experiences of students*
By means of X, Y *By means of concrete exercises and experiences, Dale's Cone of Experience is employed to better leverage the student's ability to understand the abstract concepts*	Input: X Output: Y Input: *concrete exercises and experiences* Output: *Dale's Cone of Experience is employed to better leverage the student's ability to understand the abstract concepts*
Y through X OR Through X, Y *The West has created competitiveness through fostering a culture of entrepreneurship*	Input: X Output: Y Input: *fostering a culture of entrepreneurship* Output: t*he West has created competitiveness*

Table 8. Input-output pairs

XStatementID	YStatementID	X Statement	Y Statement
Ginsberg 2004 X1	Ginsberg 2004 Y1	implementation of a bpm solution	results in improved processes
Simms 2004 X1	Simms 2004 Y1	an effective bpm solution	enables organizations to change or improve processes
Simms 2004 X1	Simms 2004 Y2	an effective bpm solution	enables organizations to make better, more timely decisions

Table 9. Combined X and Y statements

StatementID	Statement
Ginsberg 2004 X1	the implementation of a bpm solution
Ginsberg 2004 Y1	will most definitely generate returns in the form of improved processes
Simms 2004 X1	an effective bpm solution
Simms 2004 X1	an effective bpm solution
Simms 2004 Y1	will make better, more timely decisions
Simms 2004 Y2	will identify where business processes need to be improved or changed

Table 10. Final corpus

StatementID	Statement
Ginsberg 2004 X1	the implementation of a bpm solution
Ginsberg 2004 Y1	will most definitely generate returns in the form of improved processes
Simms 2004 X1	an effective bpm solution
Simms 2004 Y1	will make better, more timely decisions
Simms 2004 Y2	will identify where business processes need to be improved or changed

Table 11. Matrix X, containing term frequencies

	Ginsberg 2004 X1	Ginsberg 2004 Y1	Simms 2004 X1	Simms 2004 Y1	Simms 2004 Y2
bpm	1	0	1	0	0
business	0	0	0	0	1
decisions	0	0	0	1	0
effective	0	0	1	0	0
implementation	1	0	0	0	0
processes	0	1	0	0	1
returns	0	1	0	0	0
solution	1	0	1	0	0
timely	0	0	0	1	0

Table 12. Matrix X, containing TF-IDF weighted normalized frequencies

	Ginsberg 2004 X1	Ginsberg 2004 Y1	Simms 2004 X1	Simms 2004 Y1	Simms 2004 Y2
bpm	0.4435	0	0.4435	0	0
business	0	0	0	0	0.869
decisions	0	0	0	0.7071	0
effective	0	0	0.7789	0	0
implementation	0.7789	0	0	0	0
processes	0	0.4948	0	0	0.4948
returns	0	0.869	0	0	0
solution	0.4435	0	0.4435	0	0
timely	0	0	0	0.7071	0

Table 13. Term loadings before and after varimax rotation

	Term Loadings					
	Unrotated			Rotated		
Terms	F1	F2	F3	F1	F2	F3
bpm	0.6271	0	0	0.6271	0	0
business	0	0.6145	0	0	0.6145	0
decisions	0	0	-0.7071	0	0	0.7071
effective	0.5508	0	0	0.5508	0	0
implementation	0.5508	0	0	0.5508	0	0
processes	0	0.6997	0	0	0.6997	0
returns	0	0.6145	0	0	0.6145	0
solution	0.6271	0	0	0.6271	0	0
timely	0	0	-0.7071	0	0	0.7071

Table 14. Statement loadings before and after varimax rotation

	Statement Loadings					
	Unrotated			Rotated		
Statements	F1	F2	F3	F1	F2	F3
Ginsberg 2004 X1	0.8347	0	0	0.8347	0	0
Ginsberg 2004 Y1	0	0.7889	0	0	0.7889	0
Simms 2004 X1	0.8347	0	0	0.8347	0	0
Simms 2004 Y1	0	0	-1	0	0	1
Simms 2004 Y2	0	0.7889	0	0	0.7889	0

Table 15. X statement loadings

	Factors		
X Statements	F1	F2	F3
Ginsberg 2004 X1	0.8347	0	0
Simms 2004 X1	0.8347	0	0

Table 16. Y statement loadings

	Factors		
Y Statements	F1	F2	F3
Ginsberg 2004 Y1	0	0.7889	0
Simms 2004 Y1	0	0	1
Simms 2004 Y2	0	0.7889	0

Table 17. Inter-factor matrix F

X Factors lead to Y Factors		X Factors		
		F1	**F2**	**F3**
Y Factors	F1			
	F2	2		
	F3	1		

Table 18. X-index, Y-index, and X-Y differential

X Factors lead to Y Factors		X Factors			
		F1	**F2**	**F3**	**Y-index**
Y Factors	F1				**0**
	F2	2			**2**
	F3	1			**1**
X-index		**3**	**0**	**0**	
X - Y differential		**3**	**-2**	**-1**	

Table 19. Matrix F – percentage measures

X Factors lead to Y Factors		X Factors			
		F1	**F2**	**F3**	**Y-index**
Y Factors	F1				**0**
	F2	0.67			**0.67**
	F3	0.33			**0.33**
X-index		**1**	**0**	**0**	
X - Y differential		**1**	**-0.67**	**-0.33**	
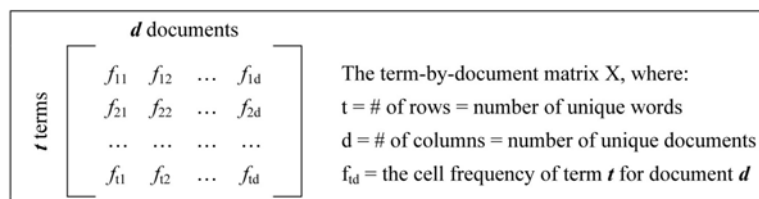
Figure 1. Schematic of the term-by-document matrix X

Figure 2. The SVD of matrix X ($X = TSD^T$)

$$
\begin{bmatrix}
0 & 0 & 0 & 0.63 & 0.61 & 0.61 & 0.45 \\
0.6 & 0.66 & 0.5 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0.42 & 0.41 & 0.41 & 0.3 \\
0.68 & 0.74 & 0.56 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0.51 & 0.49 & 0.49 & 0.36
\end{bmatrix}
=
\begin{bmatrix}
0.69 & 0 \\
0 & -0.66 \\
0.46 & 0 \\
0 & -0.75 \\
0.55 & 0
\end{bmatrix}
\times
$$

X-hat   =   T-hat   ×

$$
\begin{bmatrix}
1.68 & 0 \\
0 & 1.54
\end{bmatrix}
\times
\begin{bmatrix}
0 & 0 & 0 & 0.55 & 0.53 & 0.53 & 0.39 \\
-0.59 & -0.64 & -0.49 & 0 & 0 & 0 & 0
\end{bmatrix}
$$

S-hat   ×   D-hat^T

Figure 3. The SVD of the reduced model ($\hat{X} = \hat{T}\hat{S}\hat{D}^T$)
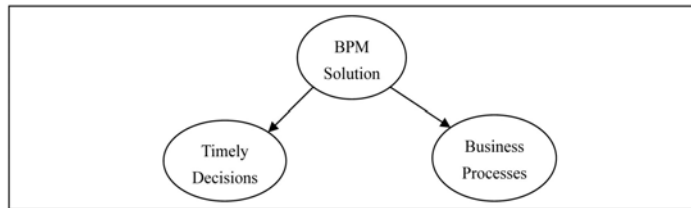
Figure 4. Relationships between BPM solution, business processes, and timely decisions
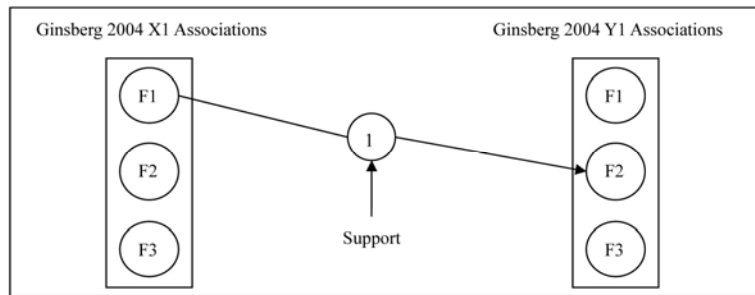
Figure 5(a). Inter-factor associations and support
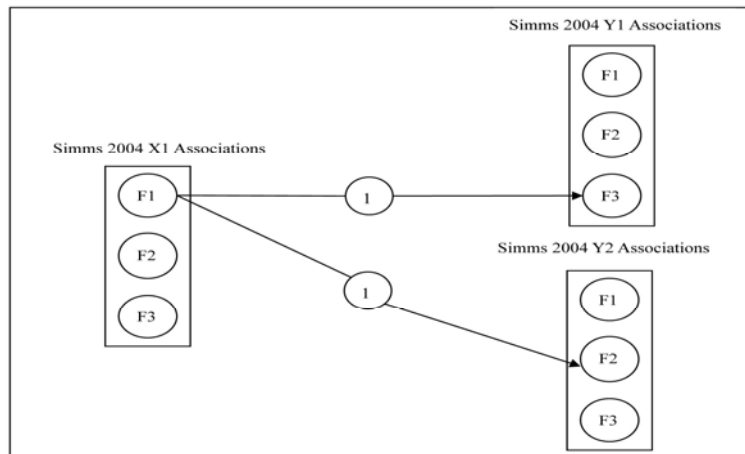
Figure 5(b). Inter-factor associations and support
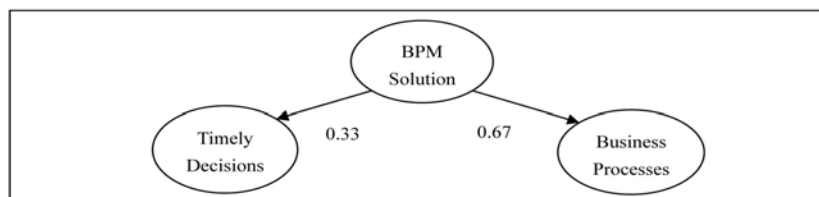
Figure 6. Inter-factor relationships and their strength of association

Conceptual Fair Value Accounting for Internally Generated Intangible Assets for Bulgarian Companies

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Abstract

This paper explores some of the conceptualissues related to reporting internally generatedintangible assets at fair value for Bulgarian Enterprises. For the scope of this paper, we evaluate the current accounting framework for intangible assets (both externally and internally generated) and its implications for small and middle size enterprises in the corporate Bulgarian settings. We note that some of the conceptual findings in this paper could be utilized as basis for further comprehensive research on intangible accounting for other countries. In addition, we argue that the principles and guidance for identifying the existence of externally generated intangible assets as a result of business combinations could be adopted for assessing whether internally generated intangible assets exist. That is, we believe thatinternally generated intangible assets can be recognized and presented in the financial statements at their fair value according to applicable accounting standards.

Keywords: Fair value, Intangible assets

1. Introduction

Bulgarian companies, depending on certain criteria (discussed later in this paper), are required to follow the International Financial Reporting Standards (IFRS), National Financial Reporting Standards (NFR) for SMEand/or the rules and regulations set by the Bulgarian Accounting Act, as a basis for reporting and presentation of their financial operations (Bulgarian Accounting Act, 2007). According to these rules and regulations [(NAS 38, 2007), (IAS 38, 2007)] externally generated intangible assets can be recognized and reported in the financial statements of an enterprise at fair value at time of acquisition. However, internally generated intangible assets are recorded as current expense when incurred. That is, despite their importance and significance to the many reporting entities, the existing accounting standards do not allow recognition as an asset, when the definition criteria for an asset is met, which creates a double standard of accounting.

The Bulgarian Accounting Authorities have not taken the initiative to create methods for identification or to allow the capitalization or recognition of most internally generated intangible assets. In the past, many researchers [(Barth, 2003) (Roslender and Fincham, 2001)] on the topic of intangible assets' accounting have provided arguments towards the technical feasibility of initial identification, measurement, and recognition of these assets. The arguments for the failure of the current accounting framework (IAS 38) to properly identify, measure, and recognize the activities associated with intangible assets, appear at a time when the accounting profession is under the scrutiny by the Securities and Exchange Commission and the International Accounting Standards Board (IASB) [Gelb and Siegel, 2000]. In an effort to achieve greater harmonization of the global economy creates additional pressure on the IASB (for IAS 38) and FASB (for FAS 141 and 142) to strive continuously towards greater flexibility.

In our current financial environment, there seems to be a shift in the Bulgarian accounting community towards developing further understanding of the internally generated intangible assets. In the fast-paced knowledge economy, enterprises that have the greatest understanding of their assets and that are able to tap into their collective resources, will get ahead in the competitive stakes and deliver high levels of service and performance [Roslender and Fincham, 2001, 2004, 311-329, 383-399]. There are many companies that have started reporting their intangibles, such as sports companies. However, the complete disclosure is still at its embryonic stage.

In this paper, we analyze some of the issues related to reporting internally generated intangible assets at fair value. We note that there are various methods to measure and account for internally generated intangible assets. The practice of accounting for intangible assets at fair value by financial organizations in Bulgaria is closely related to the principles of IAS 38 and NAS 38 of "assessment after initial recognition". However, there are issues related with measurement and there is no specific solution to fit all scenarios. Disputes arise at times, concerning the correctness

of the reporting models, hence the correctness of the formulation of the report. However, we trydefine the basic model for assessment.

2. Definition for intangible assets under the current accounting framework – IAS 38

In order to start the discussion for measuring intangible assets at fair value in the financial statements of the Bulgarian enterprises, we need to examine some of the requirements regarding the nature, definition, classification, acquisition, recognition and evaluation of intangibles according to the current accounting framework. For the purpose of this discussion, we will omit the Bulgarian Accounting Act as it relates only to presentation of the financial information.

IAS [2007] defines an asset as a resource that is "controlled" by the company as a result of a "past transaction" that is expected to contribute towards "future benefits" with "reasonable probability". The definition of an intangible asset goes further to require that the item in question does not have "physical substance" [IAS 38, 2007]. In addition, IAS 38 [2007] requires that an intangible asset must be "identifiable" in order to be "distinguishable from goodwill" (paragraph 10). To explain the meaning of 'identifiable', IAS 38.12 [2007] states that:

An asset is identifiable if it either:

(a) Is separable, ie is capable of being separated or divided from the entity and sold, transferred, licensed, rented or exchanged, either individually or together with a related contract, identifiable asset or liability, regardless of whether the entity intends to do so; or

(b) Arises from contractual or other legal rights, regardless of whether those rights are transferable or separable from the entity or from other rights and obligations.

The definition of an intangible asset requires it to be identifiable in order to be separated from goodwill [IFRS 38, 2007]. In a merger or acquisition context, the difference between the amount the acquiring company pays for the acquired company and the fair value of the acquired company's assets would be recorded on the acquiring company's balance sheet as goodwill.

In the realm of accounting treatment of intangibles, a further distinction exists between treatment of internally generated intangibles and purchased intangibles. Purchased intangibles are capitalized and placed on a company's balance sheet. Internally generated intangible assets must be out of the "research phase" and into the "development phase" and then pass six additional tests [IAS 38, 2007]:

(a) The technical feasibility of completing the intangible asset so that it will be available for use or sale;

(b) Its intention to complete the intangible asset and use or sell it;

(c) Its ability to use or sell the intangible asset;

(d) How the intangible asset will generate probable future economic benefits. Among other things, the entity must demonstrate the existence of a market for the output of the intangible asset, or the intangible asset itself or, if it is to be used internally, the usefulness of the intangible asset;

(e) The availability of adequate technical, financial and other resources to complete the development and to use or sell the intangible asset; and

(f) Its ability to measure reliably the expenditure attributable to the intangible asset during its development.

The definition and basic characteristics of intangible assets in IAS 38 [2007] are similar to those in NAS 38 [2007]. The minor differences that can be seen in the Bulgarian standard give it a slight nuance but, by no means, they change the essence of its contents. Nevertheless, various permits, licensees, accreditations and others, given by the state or its representatives, meeting the criteria of intangible assets in the Bulgarian enterprises, are not reported as such. In a similar way, intangible assets are not going to be reported if at an enterprise a scientific research work is produced which is used in production but is not patented.

The Bulgarian financial report requires clear documentary confirmation of the economic facts, events, and processes, including intangible assets. This is a result from the fact that until recently, the users of the information in the report were the different regulating organs. The compulsory requirement for properly formed documents, and the concept of document validity regulated by the law, restrict the acceptance of intangible assets in the Bulgarian practice of accountancy and push them as concepts away from the understanding for intangible assets in IAS/IFRS [IAS 38, 2007]. Typical example is not accepting the web site for intangible assets per NAS 38 compared to IAS38 This asset has all features of an intangible assetbut it is not recognized as an intangible assets on the financial books of the company:

• brings economic benefit to the enterprise,

• availability of properly formed documents, confirming the existence of the asset itself, and the right of the enterprise on the intellectual product,

• can be distinguished, will be used for a long time, i.e. the useful period is more than 12 months,

• the enterprise does not intend to sell the asset in the following 12 months,

• the real initial price can be reliably appointed,

• there is no natural-material form

Further IAS 38 [2007] is supplemented by illustrative examples of items acquired in business combinations that meet the definition of an intangible asset. These examples are not all exhaustive. However, these examples are indicative and broader than the types of intangible assets explicitly provided prior to the initial issue of IFRS 3 in March 2004. The examples are classified under the following headings [IAS 3, 2007]:

• **Marketing-related intangible assets** (trademarks, trade names, service marks, certification marks, collective marks, internet domain, trade dress, newspaper mastheads, non-competition agreement);

• **Customer-related intangible assets** (customer lists, order or production backlog, customer contracts and the related customer relationships, non-contractual customer relationships);

• **Artistic-related intangible assets** (copyrights for books, plays, films, music, pictures, photographs, operas and ballets, musical works such as compositions, song lyrics and advertising jingles, video and audiovisual material including films, music videos and television programmes);

• **Contract-based intangible assets** (licensing, royalty, standstill agreements, advertising, construction, management, service or supply contracts, lease agreements, construction permits, franchise agreements, broadcast rights, use rights, such as water, air, timber cutting, servicing contracts such as mortgage servicing contracts, employment contracts);

• **Technology-based intangible assets** (patented technology and unpatented technology, software, databases, trade secrets such as formulae, processes and recipes).

There may be certain intangible-type items that the company does not intend to use. It may be that the company holds these items in order to deny other parties access to them. These items may meet the definition of an intangible asset. That is, these items may be "controlled" by the company (without "physical substance") as a result of a "past transaction" that is expected to contribute towards "future benefits" with "reasonable probability". Therefore, the protection of income and revenue from competition (due to internal holding), for example, is an asset [CFA Institute Centre for Financial Market Integrity, 2007].

If the definition criteria for "control", "identifiability" and "future benefits" are not met, the expenditure is recognized as an expense or as part of purchased goodwill if it involves a business combination [IAS 38, 2007]. Outside research and development (R&D) expense, there is generally no requirement for separate "intangible expense" line items on the income statement under IAS 38 [2007]. In a joint project, Wyatt and Abernethy [2003] state that:

Intangible expenditures that are not recognizable as assets will therefore not be transparent in the income statement. It will be aggregated into cost of goods sold and/or sales, general and administration expenses. Investors will have to look to non-financial information elsewhere to evaluate the quantum and return on the company's resources allocated to activities of an intangible nature.

Even if the specific items meet the asset definition criteria, they still will not appear on the balance sheet if they do not meet the asset recognition criteria for assets. Similar recognition criteria focus on two factors: the uncertainty associated with future benefits and a reliable "cost" to record the asset from a verifiable transaction.

IAS 38 [2007] states that an "intangible asset should be recognized if, and only if: (a) it is probable that the future economic benefits that are attributable to the asset will flow to the enterprise; and (b) the cost of the asset can be measured reliably". "Cost" is defined as the amount of cash or cash equivalents paid or the fair value of the other consideration given (for example, shares) to acquire an asset [IAS 38, 2007], and "fair value" is a price from an arm's length transaction. Most jurisdictions adopt similar recognition criteria. Wyatt and Abernethy [2003] further state that:

The accounting frameworks rely heavily on particular elements of the asset definition and recognition principles. Specifically, intangible assets are typically identified only by reference to transactions between the firm and an external party. This ensures a verifiable measure is available to record the asset, thus, satisfying the 'reliability' component of the asset recognition criteria (that is, (b) above). The weighting given to reliable measurement is

reinforced by a 'relevance versus reliability' principle. This is an over-riding principle that requires the relevance of a reported asset to external users of accounting information is balanced against the reliability of the reported number.

3. Intangible assets under the Bulgarian accounting framework

In Bulgarian accounting literature and practice, the concept of intangible assets was brought into use after the change of the economic and political system at the end of 1989. The initial regulations and rules of the concept were not sufficiently clear and concrete. Currently, the accounting of intangible assets (externally and internally generated) in Bulgaria and their presentation in the financial statements of companies is based on the following basic regulations:

• Bulgarian Accountancy Act [2007] – it governs the accounting requirements for comprehensiveness and reliability of accounting systems (accounting) in enterprises, the content, preparation and publicity of the financial statements of enterprises as well as the requirements for those who prepare financial statements.
• National Financial Reporting Standards for Small and Medium Enterprises (NFRS for SME) [2007] - adopted by the Council of Ministers of the Republic of Bulgaria in accordance with the Directives of the European Union and the national peculiarities
• International Accounting Standards/ International Financial Reporting Standards (IAS/IFRS) [2007] – adopted by companies starting January 1st, 2005

For SME in Bulgaria, the financial statements must be prepared in accordance with the edicts and decrees of NFRS. These rules and regulations are applied by enterprises that meet the following criteria, for at least two preceding years [NFRS, 2007]:

• Balance value of the assets by December 31st– less than 8 million levs
• Net incomes from sales for a year – less than 15 million levs
• Average number of the staff for a year – less than 250 people

The companies in the Republic of Bulgaria with the exception of the small and medium enterprises, mentioned from the above criteria, are required to present their annual financial statements based on IAS/IFRS (as of January 1st, 2005) [NFRS, 2007]. Moreover, if previously a company has presented its financial statement based on IAS/IFRS, it cannot apply NFRS for SME in its future, regardless if it meets the above criteria in a future period. This by itself is problematic and it subject to revision as there is demand for change by the accounting community.

There are significant costs invested in intangibles (internal or external) including resources such as internally generated intangible assets, the long-term customer base, product and process related technologies, information technology, and brands and intellectual property. To date, the traditional categorization of expenditures evident in the financial statements does not identify and measure expenditures on these intangibles separately from expenditures on tangible investment and current production (operating expenditures).This contrasts with the accounting for tangible investment, which separately accounts for all expenditures not consumed in a single accounting period as assets. In searching for better ways to account for intangibles, to date, regulators and researchers have focused on the accounting choice problem relating to the existence and recognition of intangible assets. That is why identifying and separately reporting the expenditures on intangible investment is the logical first step in accounting for intangible investments.

However, there is a problem for financial reporting, as there are two properties of intangibles that render these investments more uncertain than tangible assets. These are as follows [Edvinsson, 2002]:

• Expenditures on intangibles are heterogeneousand non-standardized. Heterogeneity and standardization are a function that account for how often tasks have been performed before and the ease of copying. Plant, property and equipment are relatively standardized compared to payments for intellectual inputs from employees and payments for produced intangible assets from outside the firm [Flamholtz, 1974].
• The intangibles have no property rights. Either the assets are embodied in employees who cannot be owned or there are rents, which are easily dissipated by imitation.

As a result of these two properties (heterogeneity and non-standardized, lack of property rights), expenditures on intangible investments are inherently uncertain. Despite this inherent uncertainty, these expenditures are undertaken with the intention of generating future benefits, and the expenditures are investments by nature. However, from an accounting perspective, full capitalization of highly uncertain expenditures is not feasible.

These problems provoked us to focus our research on the existing accounting rules, regarding the definition, initial recognition and measurement at fair value of the intangibles for the purposes of financial statements. The changing nature and role of intangibles in Bulgarian business practice raises many questions for the practical accounting treatment of such resources in our enterprises.

As mentioned above, Bulgarian enterprises apply as basis for preparing the financial statements IAS/IFRS or NFRS for SME. Accounting for intangibles is regulated in NAS 38 Intangible assets and IAS 38 Intangible assets. The Bulgarian accounting standard is similar in philosophy, basic rules and requirements to the international accounting standard.

4. Fair value reporting for intangible assets for Bulgarian companies

The practice of accounting for intangible assets at fair value by financial organizations in Bulgaria is closely related to the principles of IAS 38 and NAS 38 of "assessment after initial recognition". However, there are issues related with measurement and there is no specific solution to fit all scenarios. Disputes arise at times, concerning the correctness of the reporting models, hence the correctness of the formulation of the report. However, we must define the basic model for assessment.

The accounting model utilizing the acquisition price is recommended for the initial recognition of intangible assets. This method allows for initial recognition at the purchase price and further reduction due to accumulated amortization and accumulated losses from devaluation. The initial value of the asset is objective, i.e. it is a result from a transaction between equal partners – seller and buyer. The seller selects a price greater in order to compensate his/her costs and guarantees some profit. The buyer selects a price not higher than the one which would bring him future benefit. Thus, the purchase price (initial price) is the balance price between supply and demand, relevant to the current market value at time of purchase. Using this model would diversify of versions of influence on the accounting policy of the enterprise and reduce the choice of amortization variations for the intangible assets. Apart from that, intangibles are also tested for depreciation. This version is typical for the Bulgarian practice and does not need any additional explanation. Such are missing in IAS 38, as well as in NAS 38. However, in a successive period the current market price is an object of accountancy (the price that has to be paid for this moment, at present), and will change, as a rule, in the direction of increasing compared to the purchasing price. Within the years of increasing inflation, these processes can be clearly observed. The enterprises in Bulgaria which offer IAS/ISFS may prefer the model of revalued cost of intangible assets. Once chosen this model, the intangible asset, after its initial acceptance, has to be accounted at a revalued cost. It is appointed to be its fair value on the date of revaluation minus the accumulated depreciation and losses from devaluation. For the needs of the revaluation, according to IAS 38, the fair value has to be appointed at the presence of an active market. To avoid the substantial difference of the balance value of the intangible asset from its fair value, the intangible asset has to be regularly revalued. It is important to note that the fair value does not reflect real purchasing done by the enterprise but a definitely circumstantial sum, subjectively measured, which can be calculated in case of selling the intangible asset [Van Der Meer-Kooistra, 2001]. The fair value is assessment which is based on future payments. This distinguishes the concept of fair value from the concept of market value – the sum which can be drawn from the selling of the intangible asset on the market.

5. Critique on the fair value reporting for intangible assets

IAS/IFRS specially stipulates the circumstance, according to which the presence of the intangible asset on the market is a rare phenomenon. This is the situation on the international market, as well as in Bulgaria. In spite of all it is sometimes possible to find an active market. For example, in some jurisdictions it is possible to have an active market free negotiation of licenses for transportation of passengers, fishing, and production quota. At the same time, an active market cannot exist for trademarks, licenses for the production of music or films, patents or trademarks, as long as such assets can almost always be classified as unique. There are no two equal products, two trademarks or inventions the same, therefore, the unique asset has to have unique price. Besides, although the intangible assets are also subjects of transactions, and contracts are signed between the two parties, public transactions or auctions are rare. This is why, the price given for one intangible asset can rarely be used as a base for the fair value of another asset. Very often, the information about transaction prices is confidential and is kept a secret.

According to IAS 38 [2007], the frequency of revaluating intangible assets depends on the volatility (fluctuation) of the fair value of the depreciated intangible asset. If the fair value of the revalued asset considerably differentiates from its balance value, it is necessary to make an additional revaluation. The fair assessment of some intangible assets may be considerably altered, which requires daily revaluation of the asset.

If an intangible asset can be added to the group of the revalued intangibles, it cannot be revalued because of the fact that there is no active market for such an asset [Mayo, 2001]. Such an asset should be accounted at an acquisition price reduced by the accumulated depreciation and the loss from devaluation. In other words, such an asset should be accounted by the model of accounting at an acquisition price, and, if the fair price of the revalued intangible asset can no longer be determined by the active market price, its revalued cost on the date of the last revaluation, done at an active market reduced by the accumulated later depreciation and loss from devaluation.

In "Fighting the war for talent is hazardous to your organization's health", Pfeffer [2001] criticized that market-based approaches have limitations with their applicability – not all forms of internally generated intangible assets can be bought in. In addition, "there is the problem that the costs of bought-in services would be expected to be somewhat higher than internal employment" [Pfeffer, 2001]. Given a premium for flexibility and given the cost pressures on firms, if services could be bought in at a cheaper rate than internal employment it seems likely that this would already be happening [Pfeffer, 2001]. In addition, in his research Pfefferpresents the limitations of the other two major approaches:

• cost-based approaches – the value of internally generated intangible assets is determined by the costs of acquiring it [ie salaries and benefits] – amortized over expected future service [Pfeffer, 2001]
• income-based approaches – here value is related to the income that a person might generate for the firm [Pfeffer, 2001]

Pfeffer [2001] discusses the cost-based approaches and concludes that these approaches do not recognize the importance of the value-creation effect that is one of the major reasons for seeking greater information on internally generated intangible assets in the first place. "If the value generated by internally generated intangible assets were no greater than its cost, the firm would be making a serious loss!" [Pfeffer, 2001]. On the other hand, income-based approaches recognize the value-creation effect of internally generated intangible assets but are only effective where there is a relatively predictable one-to-one relationship between individuals and revenue generation [Pfeffer, 2001].

Conclusion

The accounting model utilizing the acquisition price is recommended for the initial recognition of intangible assets. This method allows for initial recognition at the purchase price and further reduction due to accumulated amortization and accumulated losses from devaluation. However, the Bulgarian business culture, in similarity with the Eastern European, would not benefit from the application of the fair value accounting concept, specifically for the accounting of intangible assets. Although historically starting from the 1970s, internally generated intangible assets are increasingly recognized as an important component in business performance, they pose a unique set of tribulations related to the financial reporting of a company. Unlike other types of assets, these items are not owned by the organization, but are held through the employment link. In addition, these intangibles are not easily quantified at fair value. From an economic perspective, these capital items represent the equilibrium between the demand for and supply of human capabilities. Specifically for Bulgaria, the main obstacle is the fact that accountants are not prepared to speak out their professional opinion. The Bulgarian accountant is not inclined to reveal in the report information that requires reasoning in relation to internally generated intangible assets. In conclusion, the practice of accounting intangible assets at fair price in the financial reports of the Bulgarian enterprises and the acceptance of the principle of fair presentation of accounting information could be accepted with difficulty due to the following main causes:

• Accountants are afraid to go out of the frame of their own competency

• The definition of fair value is considered more as a function of the value, rather than of the accountant

• The conception of fair value is rather new for the Bulgarian practice

References

Abeysekera, I. (2006). The project of intellectual capital disclosure: research the research. *Journal of Intellectual Capital,* Vol. 7, No. 1.

Barth M.E., Clinch G. and Shibano. (2003). Market effects of recognition and disclosure. *Journal of Accounting Research*, Vol. 41, No. 4, pp. 581-609.

Bulgarian Accountancy Act, http://www.law.bg. 2007

CFA Institute Centre for Financial Market Integrity. (2007). *A Comprehensive Business Reporting Model: Financial Reporting for Investors,* July, Charlottesville, Virginia.

Gelb, D. and Siegel, P. (2000). Intangible assets and corporate signaling, *Review of Quantitative Finance and Accounting*(15), p. 307-323.

Edvinsson, L. (2002). *Corporate Longitude,* Bookhouse, Stockholm.

Flamholtz, E.G. (1974b). Human resource accounting: a review of theory and research*, Journal of Management Studies*, Vol. 11, No. 1.

Guthrie, J. and Petty, R. (2000). Intellectual capital: Australian annual reporting practices, *Journal of Intellectual Capital,* No. 3.

IAS 3. (2007). International Accounting Standards No. 3 *Business Combinations,*IASB, London.

IFRS 5*Non-current Assets Held for Sale and Discontinued Operations*, IASB, London.

IAS 38. (2007). International Accounting Standards No. 38 *Intangible Assets*, IASB, London.

FASB 141, Financial Accounting Standards Board, Statement No. 141 *Business Combinations,.*

FASB 142. (2001). Financial Accounting Standards Board, Statement No. 142 *Goodwill and Other Intangible Assets*, 2001.

Mayo, A. (2001). *The human value of the enterprise: valuing people as assets – monitoring, measuring, managing*. London, Nicholas Brealey.

NFRS 38. (2007). National Financial Reporting Standards for Small and Medium Enterprises (NFRS for SME), http://www.law.bg.

Pfeffer, J. (2001). *Fighting the war for talent is hazardous to your organization's health.* Stanford, Stanford University, Graduate School of Business.

Roslender, R. and Fincham,R. (2001).Thinking critically about intellectual capital accounting, *Accounting, Auditing & Accountability Journal,* Vol. 14, No. 4, pp. 383-398.

Roslender, R. and Fincham, R. (2004). Intellectual capital: who counts, controls? *Accounting and the Public Interest,* Vol. 5, pp. 38 – 45.

Saratoga Institute's. (1999). *Human Resource Financial Report*.

Van Der Meer-Kooistra, J. and ZijStra, S.M. (2001). Reporting on intellectual capital, *Accounting Auditing and Accountability Journal,* Vol. 14 No. 4.

Wyatt, Anne and Margaret Abernethy. (2008). Accounting for intangible investments, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1103432 [Accessed 29.05.2009].

Yield Management in the French Hotel Business: An Assessment of the Importance of the Human Factor

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Abstract

Based on a qualitative study of the practice of Yield Management in the hotel industry, and semi-direct exploratory interviews with 27 Paris hotel managers, this study highlights the strong connection between Yield Management and information systems, and stresses the great importance of the role played by the human factor in the establishment and development of an effective Yield Management system.

Keywords: Yield Management, Human resources, Hotel industry, Qualitative study

1. Introduction

Under current conditions, with the market in crisis, hotel managements are increasingly turning to technology and computer applications for decision-support tools, for example Yield Management (YM in the rest of the article), seeking a better way to manage their occupancy and optimize their income. However, YM is not a new technique. In fact, the techniques of YM have been attracting attention from numerous researchers and practitioners for more than two decades. Although its techniques have been extensively documented on the theoretical level, especially in the air-transport sector, their application and development in the hotel industry have received little attention. In order to enhance our understanding of the technique in this area, and to identify the variables and factors affecting its introduction, development, and successful use, we have employed an exploratory approach based on a qualitative methodology. Our study particularly addresses the human factor and its importance for the success of these techniques, now seen as inescapable components of the information systems of hotel organizations.

Although the introduction of new technologies has limited the scope of human intervention in certain occupations, in others it has made possible a higher level of skill, an increased responsiveness, and a greater efficiency. In this connection, YM techniques provide a type example for studies of the interaction between Man and technology. This study is intended to provide a better understanding of the role played by the human factor in the application of new technologies. Are YM techniques capable of replacing human decisions, or do they instead serve to complete and refine our own decisions on the pricing of services? In this study we will pay particular attention to human involvement in the adoption of YM techniques by French hotels.

2. Description of Yield Management in the hotel business

YM has been defined in a number of ways. However, its purpose is simple. It is to provide better management of a limited available capacity (such as airline seats or hotel rooms), so as to maximize overall income by applying a flexible pricing policy (Desiraju and Shugan, 1999) based on a segmentation of the supply (Desmet and Zollinger, 2000). The most widely accepted definition is that proposed by Smith, Leimkhuler, and Darrow (1992). They suggest that "*YM is a sophisticated way of managing supply and demand by acting simultaneously on the prices and the available capacity. It is a process of allocating the best service to the best customer at the best price and at the best time*".

Since the 1980s, YM has been extended far beyond airline pricing. Although it initially focused on modeling, the literature subsequently concentrated primarily on the applicability of this technique to other activities (Jallat and Ancarani, 2008), particularly ones that combined a certain number of conditions (Kimes, 1989). The hotel business is one of the areas that meets this requirement, and provides a context that is very favorable for the application of Yield Management techniques (Lehu, 2000).

However, as recommended by Guilloux (2000) among others, research on YM must be carried out in a more general manner, taking into account the many factors affecting its implementation and success. It would seem wise to consider first its interactions with the hotel organization's information system and human resources.

2.1. Yield management and information systems in the hotel business

According to Perrien and Ricard (1994), the organizational structure and level of technological development in which a hotel is situated directly affect its chances of successfully implementing a YM system. Along with several other authors (e.g., Warren and Ostergren, 1990; Yucelt and Marcella, 1996), Daigle and Ricard (2000) found that the use of information systems, and especially those that employ databases, was essential for the successful implementation of a YM system.

According to MacVicar and Rodger (1995), the use of computerized systems in hotels was inevitable. Management reports prepared without computer support would be too incomplete and would not allow the various market segments to be handled. In cases where capacity is limited and demand fluctuates widely, Gamble (1990) considered that the use of new information technologies to manage the available supply was essential.

If we take into account all the variables that a hotel must consider if it is to arrive at the best solution (different categories of guests, different rates, a variety of options, sales restrictions, etc.), it becomes evident that our limited human cognitive capacities will never, by themselves, be able to identify the optimal decision. Some decisions require a choice among a variety of risks that are difficult to apprehend or measure.

Sophisticated computing tools then become essential for improving the management of capacity. YM programs allow the processing of large databases replete with information on the history of the organization's activities, consumer behaviors, and the competition. This enables more accurate forecasting and the efficient, real-time management of sales. According to Lehu (2000), effective YM cannot be achieved without the use of sophisticated modeling closely adjusted to the company's activity, and usually supported by a powerful information-processing system. Computers allow us to make accurate and impartial forecasts, more in line with reality.

However, in order for YM to generate a real increase in earnings it has to be understood, learned, and above all accepted by every member of the organization (Farell and Whelan-Ryan, 1998). Poor communication between the various operating departments, a lack of understanding of YM's principles, or resistance to implementing these techniques can lead to a substantial opportunity cost. A YM system will not be of benefit to an hotel if individual employees do not effectively manage the recommendations that the tool provides.

2.2. Yield Management as a human activity

Yeoman (1996) describes YM as a system of human activity. This position is supported and discussed by Yeoman and Wateson (1997) among others. They confirm that the management process created by a YM system is basically a human activity, and that its results depend mainly on the team in charge of it. According to Daigle and Ricard (2000), when we speak of a relational approach in the hotel business we are really talking about YM. Thus the success of a Yield-Management system appears to be directly related to the human factor.

One of the factors in the success or failure of the use of YM in an organization is to be found in the intelligent use of its abilities for booking and overbooking. This assumes that the personnel is qualified and responsive (Hendler and Hendler, 2004). YM is not just a piece of software that, once installed, will function automatically. Rather, it is a method of management which managers and employees alike must be trained to use (Liberman, 2003). The main decision that the personnel responsible for reservations must make consists of choosing between two alternatives which can be summarized simply as: should I sell this unit now at this price, or should I wait in case a customer comes along who will agree to a higher price? Each of the two decisions presents a risk. If the company turns down a booking at a lower price, hoping to sell the service (room, seat, etc.) at a higher one, it risks finding itself with unsold services: this is the risk of waste. The reverse situation consists of accepting the reservation, thereby losing later customers ready to pay a higher price: this is the risk of rejects. A third decision, arising from the practice of overbooking, involves a risk of refusal. This risk occurs when the number of services sold in excess of the capacities exceeds the number of cancellations. The company is then forced to refuse customers who have made bookings, or even paid in advance.

The personnel have to manage the bookings and optimize the rate of overbooking allowed in each price category so as to minimize the resulting risks. The choices made between the three risks (waste, rejects, and refusal) directly affect the functioning of the YM system and thus the result obtained (Daudel and Viall, 1994; Capiez, 2003). YM techniques, in particular the appearance of the occupation "Yield & Revenue Manager", mark the end of decisions based on intuition and chance. Naturally it is still necessary to make use of the experience, skills, and common sense of men and women, but they all need to be supplemented by new technologies (computer tools and programs) of an ever more innovative nature.

A YM system does not take away a manager's autonomy of decision (Liberman, 1993). The expertise of a person who can accept or reject bookings remains essential for detecting possible drifts in the system under particular conditions, such as the mistaken refusal of a booking from a business customer or a regular patron. In these cases the manager is free to ignore the recommendations made by the system (MacVicar and Rodger, 1995). Meticulously following the system's recommendations can lead to problems, because the system does not address factors that are difficult to quantify—for example, no priority is assigned to a regular customer. However, it should be noted at this point that the recommendations supplied by the system are generally effective in substantially reducing the margin of error, compared with situations in which this technology is not available.

Among the seven principles set out by Cross (1998) which the organization should adopt when implementing YM techniques, we consider that two are of fundamental importance. (1) *The use of reliable information*, which means that it is necessary to compile vast quantities of detailed information and store it in historical databases. However, this may not be a real decision-support system if the information is not applied in a relevant manner. The information must therefore be processed in light of the market in order to predict future changes in consumer demand. A reliable forecast must anticipate what will happen, regardless of what people believe or what they would like to happen. Managerial intuitions can turn out to be wrong. Even experienced managers rarely display a perfect impartiality. Only a computer with an appropriate program can adequately formulate reliable predictions. (2) *Training and involving the personnel*: YM does not take the place of managers in making decisions; it is primarily a tool for supporting decisions. The role of the personnel will in no way be diminished in companies that adopt these techniques. On the contrary: it will become more important than ever. The computers will take over a significant portion of the work: the collection, processing, and distribution of data, and the sorting and filtering of information. The managers will complete this work by performing the critical analyses and making the decisions.

3. Methodology

As part of this exploratory study, semi-direct face-to-face interviews were carried out. We prefered to choose a qualitative study in order to explore in depth the perceptions of managers and to identify possible differences between them. We also believed that a quantitative study based on a questionnaire may bias the results of our study by limiting the scope and the diversity of their answers. To truly understand their opinions without orientating them we therefore decided to lead face to face interview with open questions. We conducted these interviews with a sample of 27 senior managers in 20 hotels in Paris and its environs (Appendix A). To ensure the confidentiality of the information, the interviewees were not identified, and the 20 hotels were accordingly designated H1, H2, etc. (Appendix A). Our sample then comprises 27 individuals. We interviewed 18 persons from management (15 hotel managers, one assistant manager, and two operations managers). The other persons interviewed were YM managers in their respective hotels (two revenue managers, five yield managers, one reservations manager, and one hospitality manager). In some hotels we interviewed more than one manager (two to three persons in seven hotels). The main objective of these interviews was to obtain a more detailed understanding of the components of a successful adoption of YM, and of the development of YM techniques in the hotel sector.

The 20 hotels making up our sample are of medium to large size (the smallest has 40 rooms and the biggest 736, the average capacity being 247 rooms). All the hotels we visited are in the two- to four-star luxury category (Appendix A). The choice of Paris and of hotels with relatively large capacities was necessary in order for the hotels to possess and apply a YM system. All the interviews with the 27 managers were conducted by using an interview guide endorsed by an expert in the hotel sector and a professor of marketing.

The interview guide was limited to four general topics related to the implementation and development of YM in the hotel business. The interviews had an average duration of 65 minutes (from a minimum of 35 minutes to a maximum of 2 hours 30 minutes). Apart from one hotel manager who preferred not to be recorded, all the interviews were taped. Recording the interviews made possible an almost total re-transcription of the interviewees' words. We then grouped the manager's opinions by topic, and used these groupings to obtain the following main results. This methodology was close to the one of content analysis (eg Bardin, 2007) that is often used in the study of individual perceptions. Nevertheless we decided not to use a pre-defined list of themes identified from the literature

but rather to let the themes emerge from the analysis of the interviews, in order to be consistent with the exploratory perspective we chose for this study. When we considered that two themes identified in the answers of different managers were close to each other, we decided to group them together by creating a more general theme. We then associated verbatim with each of the final themes we identified.

4. Results and discussion

The main objective of this work is to identify the decisive factors in the successful implementation of a YM system, by means of an exploratory qualitative study. In formulating our recommendations we relied on the existing literature, and on interviews conducted with hotel managers. The comments of the interviewees lead to four recommendations for the optimum use of a YM system, all directly connected to the human factor. The principal results are:

4.1. Management commitment

The commitment and motivation of management are decisive in the implementation of a relational approach (Wilson 1995). The words of the interviewees in our sample, especially the passages quoted in Appendix B, confirm this result. These managers consider that the commitment of the management is very important for the successful implementation of a YM system. Management must initiate the introduction of YM, closely monitor its operation, and be fully involved if the outcome is to be successful. They also recommend that the hotel manager and the Yield Manager work together to determine the hotel's strategy.

A firm commitment from management to succeed in this organizational change needs to be based on its conviction that such a system is necessary and worthwhile.

4.2. Importance of a YM system

The testimony presented in Appendix C shows that the interviewees are unanimous concerning the importance of these techniques. YM is found to be beneficial, profitable, useful, opportunistic, effective... which makes it a necessary, even essential tool: no hotel manager can do without it. These words recur frequently in the collected comments, and the interviewees back them up. The managers consider that these techniques provide food for discussion and bring valuable recommendations as well as significant profits arising from more accurate predictions.

These results corroborate the work of MacVicar and Rodger (1995), who found that the use of a YM system enables the personnel to "transform themselves" by becoming familiar with these techniques. Several other authors, e.g., Liberman, 1993, find that a YM system allows for more formalized decisions. These computerized tools enable a simpler control of the decisions taken, and reduce the number of errors. The dominant view is that the system strengthens the position of the decision-maker, and brings greater precision to the actions undertaken. All of the managers interviewed state that they are convinced of the substantial contributions made by a YM system to improving the utilization of information.

4.3. Contribution made by the tool (software program)

According to the managers interviewed (Appendix D), a Yield Manager cannot properly do his or her work without having a YM program. According to Liberman (1993), any YM system must be based on a sophisticated mathematical model. Indeed, without the computer and the application of a software program, the best results obtainable from YM will never be achieved, because only a computer can provide good forecasts of the demand, cancellations, no-shows, walk-ins, etc. It makes recommendations for restrictions, estimates the probable income from the displaced demand, checks availabilities, provides proposals for managing groups and durations of stay, and so on.

A YM program is thus an excellent optimization tool. It offers the person in charge (ideally a Yield Manager) a continuous response to the moment-to-moment changes occurring in the data, and a more accurate long-term overall view. The automatic processing of information provides enormous savings in terms of time, and excellent reliability in the information available for immediate use.

4.4. The major importance of the human factor

Our interviews (Appendix E) show that in order to successfully implement a YM system, the personnel must be properly trained. According to Guilloux (2000), Yield-Management training must be provided at the technical, philosophic, and cultural levels. Not only is it critically important that reservation managers be trained in the techniques and concepts of YM, but also hotel managers. According to Yeoman and Watson (1997), the process of controlling the system is essentially a human activity. Having personnel who are well trained in Yield-Management techniques will enable the hotel to seize opportunities and contribute to the successful application of the system. Proper training of the person in charge is therefore indispensable. Our interviews also confirm the findings of

Bradley and Ingold (1993) who, based on an analysis of the views of the hotel personnel they interviewed, found that it was more difficult to train managers in YM techniques without using a computer. Using a computer as a tool for training considerably reduces the perceived difficulty and complexity, because people will view these techniques as an extension of their daily tasks.

The great importance of the computer tool and the value of a YM program can then be recognized by hotel managers. However, we found that the 27 persons in our sample were unanimous in saying that the use of YM is, in the first instance, a common-sense business. To manage better and to make the necessary decisions requires capable, adaptable people, with trained teams that are able to respond quickly and effectively.

The program provides statistics, forecasts, figures, and sometimes also recommendations. But when it comes to accepting or rejecting a reservation, and for choosing among a number of risks, it is men and women who decide. The human component is therefore far from being negligible. On the contrary, it is more important than ever. Moreover, the creation of the position of "Yield & Revenue Manager" and its ever-growing importance in the hotel business is an illustration of this discussion.

A mere commitment by the management will not enable the implementation of an appropriate YM system. If the personnel do not share the same motivation the result may be disappointing, and sometimes even contrary to the objectives. A successful move to a YM system requires that every stage of the implementation process be completed. This process is essentially based on knowledge, acceptance, and training.

At the end of this endeavor, it is necessary to grasp its managerial scope. Our study confirms the main results of previous studies in non-French environments. As emphasized in the study by Daigle and Ricard (2000) among others, major hotels succeed in being "relational" by using and controlling information technologies.

Of course, in the hotel business decisions must take into account the managers' experience and their knowledge of the market and of the profiles of each type of customer. However, using only intuition and "common sense" will not lead to the optimized management of what a hotel has to offer. Under current market conditions, and especially during a crisis, acquiring sophisticated statistical-analysis tools has become a *sine qua non* for having a more profitable and competitive hotel.

The comments gathered in the interviews confirm the fundamental importance of the fact that these new YM techniques must be accepted by all of the teams (management, reservations, reception, and other). A commitment by all the parties involved, based on a firm belief in the usefulness and importance of the system and accompanied by quality training of the personnel, are prerequisites for managing a hotel under a YM system.

5. Conclusion

We believe that our research has contributed to the debate concerning (i) the importance of the adoption and development of YM techniques in hotels, and (ii) the absolute necessity of human resources capable of backing up this organizational change. It appears that the human factor is critical to the implementation of an effective YM system. Although YM has been described in many articles as a technique that makes possible accurate predictions of the behavior of demand, which can lead to higher earnings, this can really only be achieved if the results produced by the system are carefully interpreted by personnel trained to make the necessary decisions. Lastly, the success of yield management in a hotel requires the commitment of essentially all of the personnel, and a close inter-departmental coordination.

However, a broader application of the results of this study may be difficult, for several reasons, the main one being that the majority of the hotels studied belong to a chain or group of hotels. This study attempts to make a contribution to the debate on the importance of the human factor in the success of a new decision-support system. Additional research is needed to supplement it, in particular by examining broader samples and/or interviewing a number of persons occupying different positions in hotels employing YM.

References

Badinelli, R D. (2000). An Optimal Dynamic Policy for Hotel Yield Management. *European Journal of Operational Research,* **121**, 476-503.

Bardin, L. (2007). *L'analyse de contenu*, PUF.

Bradley, A, & Ingold, I. (1993). An investigation of yield management in Birmingham hotels. *International Journal of Contemporary Hospitality Management,* **3** : 2, 13-16.

Capiez, A., (2003). *Yield Management: Optimisation du Revenu dans les Services*. Hermes Science Publications.

Cross, R. G. (1998). *La Tarification Flexible*. Les Editions d'Organisation.

Daigle, A. & Ricard, L. (2000). L'approche relationnelle dans le secteur hôtelier, une étude exploratoire. *16th congrès international de l'Association Française du Marketing*, Montréal, Canada.

Daudel, S. & Viall, G. (1994). *Yield Management- Applications to air transport and other service industries*. Les presses de l'Institut de Transport Aérien: Paris.

Desiraju, R. & Shugan, S. (1999). Strategic service pricing and Yield Management. *Journal of Marketing,* **63,** 44-56.

Desmet, P. & Zollinger, M. (2000). *Le prix de l'analyse conceptuelle aux méthodes de fixation*. Economica: Paris.

Dubois, P. L. & Frendo, M. C. (1995). Yield Management et Marketing des Services. *Décisions Marketing,* Janvier-Avril, 47-54.

Farell, K. & Whelan-Ryan, F. (1998). Yield Management: A Model for Implementation. *Progress in Tourism and Hospitality Research,* 4, 267-277.

Fitzsimmons, J. A. & Fitzsimmons, M. J. (1999). *Service Management, Operations, Strategy, and Information Technology*. McGraw-Hill.

Gamble, P. R. (1990). Building a yield management system, the flip side. *Hospitality Research Journal,* **14**: 2, 11-21.

Guilloux, V. & Beluze, G. (2002). Revenue Management par Place: une Spécificité Accor. *Décisions Marketing,* 26, 7-15.

Guilloux, V. (2000). Le Yield Management: concepts, méthodes et enjeux stratégiques. *Recherche et Applications en Marketing,* **15:** 3, 56-73.

Hendler. R, & Hendler, F. (2004). Revenue Management in fabulous Las Vegas: Combining customer relationship management and revenue management to maximize profitability, *Journal of Revenue and Pricing Management,* **3**: 1, 73-79.

Jallat, F., & Ancarani, F. (2008). Yield management, dynamic pricing and CRM in telecommunications. *The Journal of Services Marketing,* 22: 6, 465-478.

Jauncey. S., Mitchell I., & Slamet P. (1995). The Meaning and Management of Yield in hotels. *International Journal of Contemporary Hospitality Management,* **7:** 4, 23-26.

Kimes, S. (1989). The Basics of Yield Management. *The Cornell Hotel and Restaurant Administration Quarterly,* **30**: 3, 14-19.

Lehu, J. M. (2000). Internet comme outil de Yield Management dans le tourisme. *Décisions Marketing,* 19, 7-19.

Liberman, W. H. (1993). Debunking the Myths of Yield Management. *The Cornell H.R.A. University*, 2, 34-41.

Liberman, W. H. (2003). Getting the most from Revenue Management, *Journal of Revenue and Pricing Management,* **2**: 2, 103-115.

Luciani, S. (1999). Implementing Yield Management in Small and Medium Sized Hotels: An Investigation of Obstacles and Success Factors in Florence Hotels. *International Journal of Hospitality Management,* **18**: 2, 129-142.

MacVicar, A, & Rodger J. (1995). Computerized yield management systems: a comparative analysis of the human resource management implications. *Paper from the IAHMS Conference Gothenburg*.

Perrien, J., Ricard Icard, L. (1994). L'approche Relationnelle dans le Secteur Bancaire. *Revue Gestion*, Décembre, 21-26.

Smith, B., Leimkuhler, J., Darrow, R. & Samules J. (1992). Yield Management at American airlines. *Interface,* 1, 8-31.

Warren, P., Ostergren, N. W. (1990). Marketing Your Hotel: Challenges of the '90s. *The Cornell Hotel and Restaurant Administration Quarterly*, May, 56-59.

Wilson, D. T. (1995). An Integrated Model of Buyer-Seller Relationships. *Journal of the Academy of Marketing Science,* 23: 4, 335-345.

Yeoman I. & Watson, S. (1997). Yield Management a human activity system. *International Journal of Contemporary Hospitality Management,* **9**: 2, 80-83.

Yoeman, I. S. (1996). *A Conceptual Model of Yield Management*. Unpublished Paper Napier University Edinburgh.

Yucelt, U. & Marcella, M. (1996). Services Marketing in the Lodging Industry: An Empirical Investigation. *Journal of Travel Research,* 48, 32-38.

Table 1. Hotel sample studied and managers interviewed

Hotel code	Mgrs. Interviewed	Category (in *)	Capacity	Number of hotels	Number of Pers.	Duration
H 1	Manager D-H1	3	147	1	1	70 min
H 2	Manager D-H2	2	61	1	1	70 min
H 3	Yield Manager YM-H3	4	736	1	1	1 hour
H 4	Manager D-H4	3	144	1	1	1hr 25 min
H 5	Yield Manager YM-H5 & Assistant Manager D-H5	4	116	1	2	1hr
H 6	Manager (former YM) D-H6	4 & 3	40	3	1	1hr
H 7	Manager D-H7 Yield Manager YM-H7 & Ops. Manager DE-H7	3	364	1	3	1hr
H 8	Manager D-H8	4	146	1	1	50 min
H 9	Manager D-H9 & Reservations Mgr. YM-H9	3	118	1	2	40 min
H 10	Manager D-H10	3	190	1	1	35 min
H 11	Manager D-H11	2	300	1	1	40 min
H 12	Yield Manager YM-H12	4	289	1	1	40 min
H 13	Manager D-H13	2	326	1	1	40 min
H 14	Manager D-H14 & Hospitality Manager YM-H14	2	700	1	2	50 min
H 15	Manager D-H15	3	138	1	1	2 hr
H 16	Manager D-H16 & Yield Manager YM-H14	4	376	1	2	1hr 20 min
H 17	Manager (10 hotels) D-H17	2	103	10	1	40 min
H 18	2 Revenue Managers H18			several	2	55 min
H 19	Manager D-H19	3	315	1	1	100 min
H 20	Manager D-H20	3	85	1	1	55 min
TOTAL	20	From 2* to 4*			27	Av. = 61 min

Table 2. Management commitment

> **Manager H4:** *However, we're all convinced of the optimization we can obtain with … I think now we've got the hang of it.*
> **Manager H6:** *some managers have weekly meetings with their yield managers, and it's not a two-person team any more.*
> **Manager H8:** *you also have to really trust it …, now we can still make a mistake but that happens less and less often however! Even if we can't see the future, we have so many ways of getting quick information… I think that at a certain point, if it is properly supported, if it is well managed, there aren't a lot of possible errors.*
> **Manager H11:** *it only has to be initiated and supported by management.*
> **Manager H13:** *now, yield management is part of our way of operating.*
> **Manager H15:** *for me, working on yield management means putting the hotel's strategy into practice.*
> **Revenue Manager H18:** *yield management is an important part of the hotel... the revenue manager works directly for the management, an integral part of the management team... it's more than integral, and its more than a culture… the manager has to be fully involved with the yield manager, the top yield manager in the hotel is really the hotel manager… the managers have to understand this properly…*
> **Manager H19:** *yield management is a clear, distinct strategy… yes, it's fully integrated... there are a lot of hotels that have recruited and created positions specifically tied to yield management.*
> **Manager H20:** *Managers must follow through on the decisions of the yield managers, even if they don't agree with their advice, as long as the yield managers can show that their decisions make a contribution,*

Table 3. Perceived importance of Yield Management

> **Manager H1:** *an expert in this area makes a contribution, it adds something and creates a discussion... can give more accurate forecasts, it lets you adjust the strategy... recommendations and advice that are much more precise and valuable.*
> **Manager H2:** *today, using yield management means always being opportunistic.*
> **Yield Manager H3:** *yield management is a key factor, it's practically indispensable.*
> **Manager H6**: *It's an excellent optimization tool ... it allows you to have a long-term view, an accurate view... it's a very useful tool... it allows you to have more accurate information and to have information available immediately.*
> **Manager H7:** *we absolutely need .... yield management gives a better picture and teaches us to be as open as possible about the state of the market.*
> **Manager H8:** *these days we definitely can't work without this tool... without it, it would be hard to do our job.*
> **Manager H9:** *it's a tool that is really effective, you can feel it.*
> **Manager H10:** *I'm convinced of its benefits now.*
> **Manager H11:** *for us it's a basic item, personally I can't even imagine working without revenue management, too many mistakes, nowadays it's a useful analytical tool ... a very important tool.*
> **Yield Manager H12:** *it's a necessity in hotels.*
> **Manager H13:** *allows us to have a perfect view of the future.*
> *Manager* **H14:** *the more we use yield management the closer we get to the true picture ... it corrects us by having more experience*
> **Manager H16:** *it's an essential thing ... it's the extra that everyone needs.*
> **Revenue Manager H18**: *I think it really pays off.*
> **Manager H20:** *makes us think about our business approach, it's more a reminder about strategy ... it's part of the attraction of our work ... you have to admit that it's beneficial.*

Table 4. Contribution of the tool

> **Manager H1:** *but the tool has also contributed a lot, in fact there's an exchange, there's the tool that provides us with constraints and restrictions and we also bring things... for "strategic" hotels yield management is essential... so the more data we have concerning operations the more interesting strategic choices we can make ... A yield manager with a tool, for certain hotels that's a necessity.*
> **Yield Manager H5:** *now there are tools that help us to make decisions and enable us to sharpen our decision-making.*
> **Manager H6:** *it's an excellent optimization tool ... allows for extraordinary adaptability ... it gives you a long-term view, an accurate view ... it's a really useful tool ... it gives more accurate information and allows you to have the information immediately available... I think that everybody, all the hospitality people initially, but I believe that yield management has been developed beyond guest services, ... we need tools that are increasingly automated and increasingly sophisticated.*
> **Manager H7:** *it's our basic working equipment; it enables us to be very very vigilant.*
> **Manager H8:** *It's one of the things that we call decision-support tools ... in a few seconds the program gives us the help that several people would have trouble providing in several hours, because there are so many calculations to perform ... it's such a specialized occupation, with a need for effective tools to back it up.*
> **Manager H9:** *it's now become a tool that's easy and quick to master, which helps us in our management.*
> **Manager H10:** *the best definition I can give you: yield management is the technologic, digital, and mathematical application of common sense .... yield management is only a component, only a decision-support tool.*
> **Yield Manager H12:** *the information-processing tool helps us...*
> **Manager H14:** *experience in using this tool has shown us its finer points.*
> **Manager H5:** *we're working with a computer system ... The system, the more we feed into it, the more it gives us good recommendations - it's a support for decision-making.*
> **Manager H17:** *we now have tools that really let us get into the details of the matter (increasing load, sub-segmentation, typical days, etc.); really, it's very detailed.*

Table 5. Human Factor

Manager H1: *it's a relatively new occupation ... in my opinion it's still a commonsense one. In the hotel business, most of the time it's a person who does yield management automatically, using common sense, and you give this person a tool that works fairly well, and by using these tools the person gets better at the job .... the position of yield manager, in my opinion it's not only more important now, but it's essential, I think that nowadays a hotel without a yield manager cannot function.*

Manager H2: *human factor ... to manage a hotel you need human beings, so it's the same for doing yield management, the team you have has to know how to respond, the people can't just sit there and do nothing ... So you have to train your team to be capable of responding.*

Yield Manager H3: *yield management: we're the ones who put it all together, using common sense to obtain reliable forecasts.*

Manager H4: *yield management is simply a matter of logic and common sense.*

Manager H6: *the job of yield manager in a hotel is very important ... in some hotels the yield manager is as important as the hotel manager, he's the one who decides the strategy, not the manager.... human activity, not forgetting that there is a human side that you must have when making reservations, taking risks - you mustn't overlook the human side.*

Manager H8: *it's one of the tools that we call decision supports, the person is still the only decision-maker, a machine is not going to dictate to us, rather it's there to help us make decisions ... a yield manager must be completely independent ... if you have a poor yield manager it can be a disaster ... it's an occupation which is very interesting, which has led to questions about all kinds of choices.*

Reservations Manager H9: *now, because we have this program, we need a dedicated person to manage it on a daily basis.*

Manager H9: *it's a tool and a system that makes the human function more effective.*

Manager H10: *we've established a new occupation: the "yield manager" ... Yield management all by itself wouldn't work, you also need the concept of common sense ... by introducing just one item into it: the human factor ... the human factor is very important in making yield management work.*

Manager H11: *there's a whole process of learning, of training and acceptance ... a human activity, the tool is only the databases, ultimately it's the person who does the interpretations and it's the person who takes the risks, so yes, it's the human being who decides.*

Yield Manager H12: *it's an exchange between man and machine.*

Manager H15: *what you have to remember is that the tool only makes recommendations, it's the manager who is in charge, because the system doesn't know the environment, the market, or the competition ... So the tool, sure, it's very good but you still have to know about the seasons of the year.*

Manager H16: *responsive, yes, you have to make decisions quickly.*

Revenue Manager H18: *yield management is above all common sense, but then, nowadays it's not enough because it has to be more scientific, you need something else, common sense plus scientific tools ... So yield management is basic common sense plus the scientific aspect: that makes for a good outcome.*

Manager H19: *it's like any tool, it has to be properly used ... you have to be very, very responsive.*

Manager H20: *adaptability, experience with people, the creative aspect, they're all essential ... you have to do it effectively.*

Reliance of External Auditors on Internal Audit Work: A Corporate Governance Perspective

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Abstract

The literature suggests an increasing need for interactions among board of directors, management, internal audit and external audit as the four components of corporate governance and presents internal audit as a resource for the other components. External auditing standards that originated in the Western world, which are also being applied in developing countries, recommend external auditor's reliance on internal audit to achieve audit efficiency. Nevertheless, whether this efficiency motive explains such reliance in corporate governance settings that differ from the West has not been sufficiently explored as yet. This study examines external auditor reliance on internal audit work using questionnaire survey of 119 external auditors in Ethiopia. Mann-Whitney U test results suggest that external auditors' reliance on internal audit work is not significantly associated with the competitiveness of external audit sub-markets in Ethiopia. Results of multiple discriminant analysis indicate internal audit work performance is the most important factor that determines the extent of external auditors' reliance on internal audit work. Overall, findings suggest that organizations can enhance corporate governance effectiveness by strengthening internal audit and fostering internal-external auditor coordination.

Keywords: External audit, Internal audit, Corporate governance, External audit market, Ethiopia

1. Introduction

Coordination of internal and external audit, has received considerable attention especially over the last decade due to the understanding that robust corporate governance systems help minimize the devastating impact of corporate collapse (Rusak and Johnson, 2007). Recognition of internal audit's role in enhancing financial reporting quality underpins this notion. The Blue Ribbon Committee (1999) report presents audit committees of boards, internal audit and external audit as a three-legged-stool of corporate governance that help ensure reliability of financial reports. The use of financial information by *boards of directors* (on behalf of shareholders) and involvement of *internal* and *external audit* in enhancing the utility of this information which is provided (and also used) by the *management* (Fan and Wong, 2004; Jensen and Meckling, 1976; Blue Ribbon Committee, 1999) provides an integrated picture of the linkages that exist among the four components of corporate governance. Internal and external audit help enhance audit committee effectiveness by serving as a resource to boards of directors (DeZoort et al. 2002). Internal audit (IA) is a crucial resource in the corporate governance system as it provides services to the other three components of corporate governance (Gramling, et al., 2004; DeZoort et al. 2002). Studies focusing on audit mechanisms as a component of corporate governance in developing countries are relatively limited. Fan and Wong (2004) indicate the corporate governance role of external audit in emerging economies based on empirical evidence from East Asian countries. Nevertheless, the linkages between internal and external audit mechanisms in developing countries and the implication of the linkage for corporate governance in such settings are generally under-researched.

Professional standards on auditing, i.e., International Standards on Auditing (ISA) 610 provide guidelines on external auditors' consideration of IA work in the conduct of financial statement audits. The literature also indicates that external auditors' reliance on internal audit work could produce a significant cost saving through reduction of external audit time. External auditors assess IA work to determine the extent of their reliance on internal audit. Such reliance is also considered as an area where IA adds value through reduced audit fees (Krishnamoorthy, 2001, 2002; Morrill and Morrill, 2003; Mihret 2010; Mihret, James and Mula 2010). Such a cost-saving opportunity arguably engenders interest of the other two components of corporate governance (i.e., boards of directors and management) to promote internal and external audit cooperation.

The intention to reduce external audit costs in a bid to reduce audit fees and maintain competitiveness in the audit service market motivates external auditors' decisions to rely on IA work (Morrill and Morrill, 2003). Besides, internal auditors' closer knowledge of their organizations could provide external auditors with a possibility to reduce audit risk. Thus, testing internal-external audit linkages in diverse settings would yield useful insights of academic and practical value for corporate governance. For instance, in external audit service markets that are highly competitive, external auditors' extent of reliance on internal auditors' work could exceed those in less competitive ones. Prior empirical studies on the relationship of internal and external auditors are predominantly in the context of developed economies. Thus these linkages, their socioeconomic and cultural backgrounds, and the ensuing implications have been largely under-researched in the corporate governance settings of developing countries.

The need for testing applicability of auditing approaches to socioeconomic and cultural settings that differ from the ones in which the approaches originated is recognized (Ritchie and Khorwat, 2007). Haniffa and Cooke (2002) suggest that as environmental factors influence audit practice, the techniques and approaches prescribed for use in the developed economies may not apply to a similar extent in countries with socio-economic settings that different from the former. The overall corporate governance setting arguably influences the nature of the linkages between audit mechanisms. DeZoort et al. (2002) called for research on audit committee resources, one of which is internal audit, to identify any variations in different cultural and economic settings. This call served as a primary motivation for this study to examine external auditors' consideration of internal audit work in a developing country, Ethiopia. External auditors in Ethiopia possess professional certifications from developed Western countries; thus, auditing standards also mainly relate to those recommended by international certifying bodies.

The paper begins by providing a background about Ethiopia, which is followed by development of the research hypotheses. Section four outlines the research methods in terms of the sample and data collection procedures. The research hypotheses are tested in section five and discussed in section six. Finally, conclusions are drawn in section six.

2. Study Background and Motivation

This study was conducted based on data collected from selected audit firms in Ethiopia, an East African country with an estimated population of 85.6 million (Source: BBC, http://news.bbc.co.uk/2/hi/africa/country_profiles/1072164.stm#facts). Woldegiorgis (1992) indicates that prior to 1991, internal audit in Ethiopia was financial audit focused. Although this financial focus would help internal audit to contribute to external audit, Woldegiorgis's study shows that IA approaches lacked uniformity across organizations and IA's standards of service were rather low. As a result, external auditors' reliance on IA and the cooperation between the two was limited (Woldegiorgis, 1992). Woldegiorgis (1992, p. 29) notes that the limited contribution of IA to external audit was recognized by the then government of Ethiopia as it is quoted from the Council of Ministers' internal audit manual that 'because of the poor performance and absence in some cases of audit departments in public enterprises, the work of external auditors is delayed substantially or in some cases made almost impossible'.

Since 1987, internal audit in Ethiopia seems to have been developing with a substantial government emphasis for this development (Mihret, James & Mula 2009). However, whether or not the several government measures taken to enhance internal audit are reflected in internal-external audit linkages and the recognition of internal audit as a corporate governance resource are   not examined as yet. One possible approach to understanding the importance of IA in corporate governance mechanisms is to examine the linkages between internal and external audit.

Ethiopia's corporate governance landscape in general and audit mechanisms in particular are embedded in a setting that differs from a Western context in several ways. The legal basis for external audit emanates from the Commercial Code of Ethiopia (1960) and that for internal audit in state-owned companies emanates from directives issued by the Office of the Auditor General of Ethiopia (Argaw, 1997; Government of Ethiopia, 1987), whereas it is largely voluntary in the private sector. Office of the Federal Auditor General (OFAG) issues practice licenses to auditors in public practice. Having internationally recognized certified or chartered accountancy qualification,

membership to an internationally recognized accountancy body, and four years of experience in external audit are the major requirements to obtain a license to practice as an external auditor in Ethiopia. Ethiopian Professional Association of Accountants and Auditors (EPAAA) is the first professional accountancy body in Ethiopia that was established in 1973. However, this association does not have a legal backing to monitor and regulate the profession. As a result, practitioners are affiliated to Western professional accountancy associations—dominantly the Association of Chartered Certified Accountants (ACCA), UK (Mihret, et al., 2009; World Bank, 2007).

There is no local GAAP in Ethiopia, except that the Commercial Code of Ethiopia serves as a legal foundation for accounting and external audits of business organizations operating in the country. The country's accounting practice is influenced by the practice of other developed countries like the UK (Mihret, James & Mula 2009). Frank (1979) classified financial reporting models of countries worldwide into four groups, and classified Ethiopia in the same category as the UK. However, Frank noted that Ethiopia's practice also shows some similarity with countries that are grouped with the Latin American model. Frank's finding is reasonable as the country did not formally adopt another country's standards nor did it establish national standards. Nonetheless, organizations in some sectors—e.g. commercial banks—are required by government regulation to report in accordance with International Financial Reporting Standards (IFRS). Ethiopia is at present a member of the Eastern, Central and Southern African Federation of Accountants (ECSAFA) (Eastern Central and Southern African Federation of Accountants, 2008), which promotes adoption of IFRS by member countries and works to promote internationally accepted level of competence of its members (World Bank, 2005).

There are two external audit sub-markets in the corporate governance setting of Ethiopia. The first is external audit of state-owned enterprises (SOEs). SOEs are fully government-owned and are governed by board of directors according to proclamation No. 25/1992 (Government of Ethiopia, 1992). Audit Service Corporation (hereafter, ASC), which was established by proclamation No.126/1977 (Government of Ethiopia, 1977), undertakes external audit of SOEs[1]. This sector has a substantial prominence in the Ethiopian economy; for example, SOEs held more than 75 percent of the loan portfolios of commercial banks in the country as of July 2007 (World Bank, 2007). The second sub-market comprises private audit firms. There were 65 licensed auditors in Ethiopia as of October 2008 out of which 12 were relatively large and approved by USAID (USAID, 2004). Private audit firms are responsible for the audit of private sector organizations[2] and obtain clients through competitive bidding, which led to a fierce competition in Ethiopia's private sector audit-sub market (Lemessa, 1996).

Internal audit's relationship with board of directors (or audit committees) is considered to be of fundamental importance to achieve sound corporate governance (Maletta, 1993; Messier and Schneider, 1988). Privatization and Public Enterprises Supervisory Agency (2004) issued a directive that provides guidelines for corporate governance of state-owned companies in Ethiopia. The Agency (2005b) also issued a directive that governs internal audit in SOEs, which requires that all state-owned enterprises establish internal audit departments. The directive requires that internal audit departments report on operational matters to audit committees and administratively to general managers of the respective SOEs. Further, the agency (2005a) also issued another directive that requires SOEs to have audit committees. Nevertheless, while audit committees are established in some SOEs, most SOEs and private companies have no audit committees. Such differences in the corporate governance mechanisms coupled with the overall attributes of the socio-economic setting have implications for the level of linkages among components of corporate governance. Against this background, the present study examines internal-external auditor linkages in Ethiopia to identify the factors associated with such linkages and to draw implications for enhancing efficiency of corporate governance in developing countries.

3. Hypothesis Development

The literature indicates that internal and external auditor linkages by way of the latter's reliance of the former's work is beneficial to organizations (Al-Twaijry, et al., 2004; Felix, et al., 2001) and thus boards of directors and management are likely to encourage such linkages. Felix et al. find the contribution of internal auditors to financial statement audit as a significant external audit fee determinant. Reduction in audit fees results from external auditors' reliance on internal audit work (Morrill and Morrill 2003), which also implies cost saving possibility for the organisations audited (Spraakman, 1997). Thus, internal audit enables organizations achieve cost saving intentions. A dimension of this cost saving role is external audit fee reduction, which could be a substantial benefit to external auditors and their clients (Morrill and Morrill, 2003; Spraakman, 1997).

Therefore, it follows that both auditors and their clients have an incentive to seek greater extent of external auditors' reliance on internal audit work. The extent of this reliance is associated with several factors, of which Brown (1983) identified independence and work performance of internal auditors as the most important. Similarly, Abdel-Khalik, Snowball and Wragge (1983) reported independence of internal auditors as the most important factor that

determines reliance of external auditors on internal audit work. Schneider (1984)), on the other hand, identifies work performance as the most important factor followed by objectivity. Schneider attributes this slight difference from the results of earlier research to research design features, i.e., the differences in the items included under each factor used in data collection instruments. A further variation in empirical results is Schneider's (1985) study which reveals that external auditors consider competence and work performance as equally important for reliance decisions, but finds objectivity as less significant. Similarly, Haron et al. (2004) documented internal audit's competence and scope of work were the factors that external auditors consider in making reliance decision. On the other hand, Margheim (1986) indicates objectivity as a significant variable in the reliance decision and attributes the differing findings—i.e., in view of those of earlier studies—partly to the possibility of contextual factors influencing external auditors' judgments.

Another factor that influences reliance decisions is the level of inherent risk that an audit client entails (Carey, et al., 2006; Felix, et al., 2001). For high-risk clients, external auditors' use of internal audit work may reduce inherent risk because internal auditors possess a greater awareness of client operations than external auditors (Carey, et al., 2006). Internal auditors also possess superior authority of access to organizational information than external auditors (Spraakman, 1997). The reduction in the external audit effort as a result of the reduced risk may, in turn, enable external auditors to reduce fees.

Finally, internal audit effectiveness as measured by management's acceptance and implementation of internal audit findings and recommendations may impact on external auditors' reliance on internal audit work. As the extent of internal audit effectiveness exhibits variation across organizations (Mihret and Woldeyohannis, 2008; Mihret and Yismaw, 2007; Roth, 2000), the level of external auditors' reliance on internal audit work may also vary accordingly. Consequently, higher levels of acceptance of internal audit recommendations by the management may lead to higher levels of external auditor reliance than a situation where internal audit is less effective.

The variations in empirical research results on factors that determine external auditors' reliance on internal audit may raise interest to explore associations between these factors and audit market characteristics. Differences may be observed in the level of external auditors' reliance on internal audit work among external audit markets when different levels of competition for clients prevail in external audit markets. Specifically, we argue that external auditors' level of reliance on internal audit work varies depending on the level of competition in the external audit service market. As a result of government involvement in economic activity through SOEs, attributes of the corporate governance setting and characteristics of the audit market in Ethiopia differ from the dominant settings in the literature. For example the Ethiopian setting comprises two external audit sub-markets, each with different degrees of competitiveness. The first is external audit of SOEs. The Audit Service Corporation (ASC) is mandated to conduct external audit of SOEs by proclamation No. 126/1979. The second sub-market is that of private sector businesses where private audit firms compete for clients. The impact of such external audit market structure in Ethiopia (and possibly other developing countries) on the reliance of external auditors on internal audit work has not been empirically examined as yet.

In line with the foregoing arguments, it is logical to expect that the extent of external auditors' reliance on internal audit work differs between the two sub-markets in Ethiopia. That is, private audit firms, operating in a corporate governance environment characterized by competitive external audit market, could opt to rely on internal audit to a greater degree than the ASC which is granted clients by proclamation. This leads us to the first research hypothesis:

H_1. *The extent of external auditors' reliance on internal audit work by Ethiopian private audit firms exceeds that of the Audit Service Corporation.*

The best strategy to empirically test this hypothesis is to examine external auditor's views about their level of reliance on internal audit work. Therefore, the hypothesis requires an assumption that *differences in perceptions of external auditors about internal audit in the two external audit sub-markets are random*. That is, validity of the conclusions to be drawn from the test of H_1 hinges upon the assumption that perception of external auditors on internal audit practice does not vary systematically between the two groups of auditors. To establish validity of this assumption, we test the second hypothesis:

H_2. *External auditors' perceptions of internal audit practices in Ethiopian state-owned enterprises do not differ from external auditors' perceptions of internal audit practices in Ethiopian private companies.*

Consistent with our argument about the possible variations in the extent of external auditors' reliance on internal audit work by setting, the factors that influence the level of reliance also tend to exhibit variations by empirical context (Margheim, 1986). As most of the literature on this topic is based on the developed world, studies on developing countries may contribute additional evidence and/or new insights into the literature. One such evidence is that of Al-Twaijry et al. (2004) on Saudi Arabia, which indicates that the extent of external auditors' reliance on internal audit work was associated with external auditors' perceptions of internal audit's objectivity, competence and work

experience. Further empirical examination of these factors in new settings like Ethiopia may enhance our understanding of the concepts especially from the perspective of developing countries. Consequently, in line with Morrill and Morrill (2003), we test the following hypothesis:

H₃. External auditors' level of reliance on internal audit work in Ethiopia is associated with their perceptions of internal audit practice of clients.

4. Methodology

4.1 The sample

A questionnaire survey of external auditors' opinions in two sub-markets, i.e. ASC and private audit firms, was conducted to obtain the data for the study. The study is an analytical survey, which aims to explain relationships between variables rather than describe a population. Thus, representativeness of the sample to the population was not the target of the study; attempt was instead made to ensure validity of the data by applying purposive sampling (Oppenheim, 1992). This approach enabled capturing opinions of auditors with the experience in auditing clients that maintain an internal audit function.   Subject to this criterion, we aimed to obtain approximately equal number of responses from the two groups of auditors.

There were a total of 65 private audit firms in Ethiopia, registered by the Federal Office of Auditor general. As most of these are small firms that were unlikely to have large clients with internal audit units, we considered twelve[3] firms approved by USAID (USAID, 2004). Contact persons were identified in these firms and it was established that six of these audit firms had clients that maintain internal audit. Potential respondents were then identified through the contact persons in both sub-markets to ensure that external auditors with experience in clients having internal audit departments would be included in the study. Two hundred-fifty survey questionnaires, i.e. 125 each to the two sub-markets, were distributed. One hundred twenty-six responses were obtained in total, out of which 119—sixty-one from the ASC and fifty-eight from the private audit firms—were usable. This yields an overall response rate of 47.6 per cent. Since the research model consisted of five independent variables (explained in next subsection), the usable sample is expected to achieve a statistical power of 80 per cent with alpha level of 0.05 to identify a medium effect size (Hair et al. 1998).

4.2 Variables

External auditors' level of reliance on internal audit work is considered as a dependent variable in the study. The independent variables were internal auditor independence and objectivity (INDOB), internal auditor competence (COMPE), internal auditor work performance (WORKP), internal audit effectiveness (AUDITE), and the level of client's inherent risk (AUDITR). The dependent variables were measured at ordinal level and the independent variables were measured using 5-point Likert-type scale. This scale is chosen so that the resulting data is amenable to statistical analyses in testing the research hypotheses (Bohrnstedt and Knoke, 1994; Hair Jr., et al., 2006).

4.3 Data Collection Instruments

The questionnaire was pilot tested with 15 respondents, i.e., 7 auditors from the private audit firms and 8 form the ASC. Some revision was made to the questionnaire based on the comments of the respondents. The questionnaire contained a cover letter and a one-page brochure to clarify researchers' expectations. The clarification was made to enhance validity of the data (Fowler, 2002) as it was learned from the pilot study that there were variations in the titles used to refer to the internal audit functions in different organizations in Ethiopia, and that there were clients having no internal audit function.   It was indicated in the brochure that responses were sought with regard to those audit clients that had internal audit functions—matching with the Institute of Internal Auditors' (IIA) definition of internal audit, whatever title is used to refer to it. The IIA's (2004) definition of internal audit was also included in the brochure.

A 5-point Likert-type scale was used to measure external auditors' attitudes as these variables are constructs. Descriptors and corresponding numerical codes: 'Strongly Agree' [5], 'Agree' [4], 'Neutral' [3], 'Disagree' [2], and 'Strongly Disagree' [1] were provided as response options. In such a measure, it is necessary to clearly indicate the attitude object, about which opinions are sought (Bradburn, et al., 2004). Therefore, we clearly stated in the instructions that the respondents were expected to provide opinions on the statements as applied to their clients that maintain internal audit departments. The use of anchor terms from 'Strongly Agree' to 'Strongly Disagree' provides a better measure of attitude of respondents about such constructs than the use of terms that indicate frequency of occurrence (Kwok and Sharp, 1998).

Theoretically, interval scales in general and attitude scales in particular are ordinal in nature as intervals between successive values in the scale may not be equal. However, in practice, equal interval is assumed because if there are two or more correlated items to measure a variable, equality of the intervals could be assumed (Kerlinger and Lee, 2000). Furthermore, Likert-type scale has been used in prior auditing research (e.g. Flesher and Zanzig, 2000; Kalbers

and Cenker, 2007; Kalbers and Fogarty, 1995) that involved measurement of constructs. Likert-type scale also helps enhance measurement reliability as item responses under each construct could be summated, thereby reducing measurement error because errors will cancel out (Brownell, 1995).

The body of the questionnaire contained seven sections. The first section consisted of a question on the level of external auditors' reliance on internal audit work and offers four response options: 'No Reliance' [0], 'A Little Reliance' [1], 'Moderate Reliance' [2], and 'High Reliance' [3]. The use of a nominal measure makes this item similar to the item used in Felix et al. (2001) to measure the extent of internal auditors' assistance to external auditors. However, Felix et al.'s (2000) question sought dichotomous responses, with options 'extensive/moderate' and 'limited/none'. In the present study, four options were provided to offer more alternatives to respondents. Sections two through six of the questionnaire consisted of Lickert-type items with five point scale responses options as described above. All items were positively stated concepts used as indicators of the variables. Specifically, section two consisted of six items on INDOB (INDOB1 through 6); section three contained five items on COMPE (COMPE1 to 5); section four consisted of ten items on WORKP(WORKP1 through 10); section five contained three items on internal audit effectiveness AUDITE(AUDITE1 through 3); and section six contained three items on INHERI(INHERI1 to 3). Section seven was aimed at generating biographical data about respondents.

To ensure validity of measurement, items in the questionnaire were largely adopted from prior research (Bradburn, et al., 2004). As having a large number of items under a construct enhances reliability of measurement (Churchill Jr, 1979; Kwok and Sharp, 1998) multiple items were used to measure each construct to the extent the literature warrants. Kwok and Sharp recommend at least three items under each scale, which was used as a general guide for this study.

5. Results

5.1 Biographical Data

A total of 119 questionnaire responses were analyzed. Sixty-one respondents were ASC employees and 58 were from private audit firms. The respondents had mean work experience of 11.23 years, with a median of 8 years. Individual experiences ranged from 1 year to 35 years. Approximately 29 per cent of the respondents were audit managers; 48 per cent were senior auditors; and 18 per cent were auditors and junior auditors, and the rest did not reply to the job title question. Approximately 29 per cent of the respondents were certified public accountants[5], and about 13 per cent were in progress for certification[6].

5.2 Reliability Analyses

Reliability test is performed to ensure that only items that measure the same concept as the other items under a dimension were included. The reliability of the entire scale under each dimension was measured using Cronbach's alpha. Cronbach's alpha of 0.60 was used as a threshold to decide whether or not to include an item into a scale (Hair et al. 1998). Items, the deletion of which could improve overall Cronbach's alpha were excluded from the scale. All factors had Cronbach's alpha of greater than 0.60 as items that were possibly inconsistent were deleted. Item INDOB3, WORKP6, and INHERI3 were excluded from the scale. Before excluding items with low reliability, the minimum overall alpha was 0.623 for INDOB and the highest was 0.893 for WORKP. After inconsistent items were excluded, the lowest alpha increased to 0.711 for COMPE and the highest showed a slight improvement to 0.894 for WORKP. Overall, Cronbach's alpha was considered large enough to take the data as reliable.

As an additional tool for assessment of reliability, inter-item correlations were computed for each dimension. Inter-item correlation of 0.30 is considered acceptable (Hair et al. 1998); these correlations were mostly positive and above this minimum threshold. INDOB3 and INDOB5 had negative inter-item correlation, which further justifies the aptness of excluding the former from the scale. All the other items with inter-item correlation of less than 0.30 had inter-item correlation above this threshold with at least one other item. Following the reliability analyses, summative scales i.e., composite variables, were derived to reduce the data by collapsing items under each factor into a scale. This procedure helped enhance model parsimony for subsequent analysis and improve measurement reliability by minimizing measurement errors (Hair Jr., et al., 1998).

5.3 Test of Hypotheses

H₁. The extent of external auditors' reliance on internal audit work by Ethiopian private audit firms exceeds that of the Audit Service Corporation.

Mann-Whitney U was employed to test this research hypothesis because audit firm type is categorical data measured nominally, and the level of reliance was measured using an ordinal scale. Although private audit firms exhibit slightly higher reliance on internal audit work than ASC auditors, which is shown by the higher mean rank of 61.95 for the private audit firms compared to 58.15 for the ASC (Table 1), this difference is not statistically significant at 0.05 level

of confidence. Therefore, the data does not support the first research hypothesis that the level of reliance of private firm auditors on internal audit exceeds that of ASC auditors.

H₂. External auditors' perceptions of internal audit practices in Ethiopian state–owned enterprises do not differ from external auditors' perceptions of internal audit practices in Ethiopian private companies.

To test the second hypothesis, multivariate analysis of variance (MANOVA) was performed. MANOVA is chosen because the independent variable, audit firm category, is dichotomous and the dependent variables represent interval data. Questionnaire responses converted into scales were tested for appropriateness for MANOVA. Leven's test for equality of variances shows that the variances were homogeneous across the groups; thus the assumption of homogeneity of variances is met ($p > .05$) (Table 2). Multivariate test of significance was conducted using Wilk's lambda, Pillai's criterion, Hotelling's trace and Roy's greatest characteristic root. Results summarized on Table 2 (b) indicate that there were no statistically significant differences between ASC auditors' and private firm auditors' perceptions of internal audit practice ($p > 0.05$ for employment category). Thus, validity of the results of the first hypothesis is confirmed.

H₃. External auditors' level of reliance on internal audit work in Ethiopia is associated with their perceptions of internal audit practice of clients.

To identify factors that determine external auditors' extent of reliance on internal audit work, multiple discriminant analysis (MDA) was conducted by way of testing the third hypothesis. MDA enables testing this hypothesis because the hypothesis involves one dependent variable, i.e., extent of external auditor's reliance on internal audit work, and five independent variables, i.e. COMPE, INDOB, WORKP and INHERI. In addition, the variables, especially COMPE, INDOB, and WORKP are interrelated, and the relationships among variables that determine external auditor judgment are considered linear (Brown, 1983).

There were only two respondents in the 'High Reliance' category, which indicates that the minimum practical requirement (of 20 cases in a group) for using MDA was not met. Therefore, we combined moderate and high reliance categories. Consequently, the three categories, i.e. No Reliance, A Little Reliance, Moderate and High Reliance had 26, 54, and 39 cases respectively. Thus the assumption that the smallest group size (i.e., 26 in this case) should exceed the number of independent variables (i.e., 5 in this case) is also met. Equality of covariance metrics is also tested using Box's M, which indicates that the covariance metrics for the three groups—i.e., No Reliance, A Little Reliance, and Moderate and High Reliance—were equal (Box's M= 0.251, $p>0.05$) (See Table 3 [b]). All the MDA results are displayed on Table 3.

A stepwise computation was used to clearly identify the variables with the highest discriminatory power. As shown on Table 3(c), there was only one step in the process of model estimation, and WORKP was the only variable that entered into the model. The model is statistically significant (Lamda = 0.816, $p<.05$). This implies that WORKP has a statistically significant discriminatory power, but the rest of the independent variables did not have statistically significant discriminatory power. The MDA model generated is expected to achieve a hit ratio of 46.2 per cent, i.e., it can correctly classify 46.2 per cent of the cases into the three categories (Table 3(d)).

6. Discussion

This study has attempted to examine the linkages among corporate governance components by taking the case of external auditors' reliance on internal audit work in a developing country's setting of Ethiopia. It aimed to determine the level of external auditors' reliance on internal audit work and identify key factors that determine the extent of this reliance. Our choice of empirical setting of Ethiopia emanates from three sources. First, Ethiopia has an audit infrastructure that comprises two sub-markets, which enables a comparative study of audit sub-markets based on the level of audit market competitiveness. Second, the legal framework, in which external and internal audit operate in Ethiopia, differs from what has been addressed in the hitherto dominant literature. Third, in developing countries like Ethiopia where there are no local certifications of practicing auditors external audit knowhow is largely 'imported' (Mihret, James & Mula 2009). Therefore, examining how the professional auditing standards recommended by international accountancy bodies are implemented in environments without national standards enables a more complete understanding of issues related to implementation of auditing standards globally. Increasing globalization of auditing and corporate governance necessitates understanding of the issues in developing countries like Ethiopia. The results of this study suggest that there were no statistically significant differences in the extent of reliance of external auditors on internal audit work between private audit firms and the Audit Service Corporation; i.e., contrary to our expectation, the first hypothesis is not supported. There are two potential explanations for this lack of support. First, this is possibly because the extent of competition in the external audit service market for private audit firms in not highly dependent on external audit efficiency. Secondly, the scope of internal audit services in Ethiopia may be dominantly operational audit rather than financial audit. In addition, if

internal audit is focused on providing consulting services to management, this may lead external auditors to question independence of internal audit (Brody and Lowe, 2000; Plumlee, 1985). Ahlawat and Lowe (2004) indicate that consulting services could influence internal auditors' objectivity. That is, where internal auditors focus on providing consulting services to management, their objectivity may be compromised. This may provide external auditors with little incentive to rely on internal audit work in financial statement audits and create limited opportunity for external auditors to assess the complete set of activities that internal auditors perform.

The second research hypothesis is supported, which implies that the assumption that underlies the first research hypothesis is valid. Although test of H_1 indicates no difference between the perceptions of ASC auditors and private firm auditors, validity of the results is established.

The third hypothesis is also supported. Thus, the result indicates that the major concern of external auditors regarding internal audit practice was work performance of the internal auditors. The ten items in the WORKP dimension focused on scope of internal audit work, frequency of internal audit, presence of internal audit manuals, preparation and effective use of audit programs, satisfactory documentation of audit working papers, review of internal audit work and quality of internal audit reports, perceived compliance of internal audit with Institute of Internal Auditors' (IIA) Standards for the Professional Practice of Internal Auditing, and presence of external assessment and ongoing monitoring. This result is consistent with that of Schneider (1984) which indicates that work performance is the most important factor for external auditors' reliance decisions. In Schneider's (1984) study, however, perceived objectivity of internal auditors was the next significant factor; while the effect of this factor is not statistically significant in the present study.

7. Conclusion

This study has examined external auditors' reliance on internal audit work based on the empirical setting of Ethiopia. First, it explored whether auditors in more competitive external audit markets rely on internal audit work to a greater extent than their counterparts in less competitive markets. Second, the paper attempted to identify factors that are associated with the extent of external auditors' reliance on internal audit work. Questionnaires were distributed to two groups of external auditors in Ethiopia: those working in a corporate governance environment of private companies and those in state-owned enterprises' corporate governance setting. Mann-Whitney U test results show that there were no significant differences in external auditors' extent of reliance on internal audit work in the two settings. This result suggests that internal-external audit interactions in Ethiopia, and possibly other developing countries, may not be driven by external audit efficiency motives. Multiple discriminant analysis results suggest that external auditors' perceptions of internal auditors' work performance are significantly associated with external auditors' level of reliance on internal audit work. This suggests that strengthening IA could help improve internal-external audit linkages and hence enhance effectiveness of corporate governance.

The results of this study are expected to offer practical and theoretical contribution. First, the results illuminate external auditors' perception of internal audit practice in Ethiopia. This may inform boards of directors and management of organizations in the assessment of internal audit department performance. The results also provide insights to internal auditors in other countries with similar contexts as Ethiopia. Second, external auditors may have a general view of internal audit practice in Ethiopia to supplement their own understanding in forming audit judgements. Third, international professional accountancy bodies whose members are practicing in developing countries might gain an understanding that the application of external auditing standards is dependent upon the economic and institutional settings in which external auditors operate.

Potential limitations inherent in the sampling technique employed should be acknowledged. That is, purposive sampling was used in selection of respondents. As the existence of internal audit in clients is a prerequisite for respondent selection, audit firms servicing clients with internal audit departments were included in the sample. This may limit the generalizability of the conclusions to a population. Nonetheless, this will have little impact on the validity of the results as the study is mainly an analytical survey aiming to identify relationships among variables rather than describe the population statistically (Oppenheim, 1992). Further research could be done to examine the interactions of IA with the other two components of corporate governance (i.e., management and boards of directors) and the impact of this interaction on the internal-external audit linkages in developing countries. A replication of this study in other countries could also help to confirm or extend the conclusions.

References

Abdel-Khalik, A.R., Snowball, D. & Wragge, J.H. (1983). The Effects of Certain Internal Audit Variables on the Planning of External Audit Programs. *The Accounting Review*, 58, 215-227.

Ahlawat, S.S. & Lowe, D.J. (2004). An examination of internal auditor objectivity: In-house versus outsourcing. *Auditing: A Journal of Practice and Theory*, 23, 149-160.

Al-Twaijry, A.A.M., Brierley, J.A. & Gwilliam, D.R. (2004). An examination of the relationship between internal and external audit in the Saudi Arabian corporate sector *Managerial Auditing Journal*, 19, 929-944.

Argaw, L. (1997). Internal Auditing in Ethiopia: Past, Present and Future. *The Ethiopian Journal of Accountancy & Finance*, 1.

Blue Ribbon Committee. (1999). Improving the Effectiveness of Corporate Audit Committees. Viewed 31 January 2011 at http://www.nasdaq.com/about/Blue_Ribbon_Panel.pdf

Bohrnstedt, G.W. & Knoke, D. (1994). *Statistics for Social Data Analysis* ITASCA, ILLINOIS: F.E. Peacock Publishers Inc.

Bradburn, N.M., Sudman, S. & Wansink, B. (2004). *Asking Questions*. San Francisco: Jossey-Bass.

Brody, R.G. & Lowe, D.J. (2000). The new role of the internal auditor: implications for internal auditor objectivity. *International Journal of Auditing*, 4, 169-176.

Brown, P.R. (1983). Independent auditor judgment in the evaluation of internal audit functions. *Journal of Accounting Research*, 21, 444-455.

Brownell, P. (1995). *Research Methods in Management Accounting: Coopers & Lybrand Accounting Research Methodology Monograph No. 2*. Melbourne: Coopers & Lybrand and Accounting Association of Australia and New Zealand.

Carey, P., Subramaniam, N. & Ching, K.W.C. (2006). Internal audit outsourcing in Australia. *Accounting & Finance*, 46, 11-30.

Churchill Jr, G.A. (1979). A Paradigm for Developing Better Measures of Marketing Constructs. *Journal of Marketing Research (JMR)*, 16, 64-73.

DeZoort, F.T., Hermanson, D.R., Archambeault, D.S. & Reed, S.A. (2002). Audit Committee Effectivness: A synthesis of the empirical audit committee literature. *Journal of Accounting Literature*, 21.

Dornyei, Z. (2003). *Questionnaires in Second Language Research: Construction, Administration and Processing*. Mahwah, New Jersey: Lawrence Erlbaum Associates, Inc.

Eastern Central and Southern African federation of Accountants. (2008).

Fan, J.H. & Wong, T.J. (2004). Do External Auditors Perform a Corporate Governance Role in Emerging Markets? Evidence from East Asia. *Journal of Accounting Research*, 43, 35-72.

Federal Democratic Republic of Ethiopia Population Census Commission. (2007). Summary and Statistical Report of the 2007 Population and Housing Census Results.

Felix, W.L.J., Gramling, A.A. & Maletta, M.J. (2001). The Contribution of Internal Audit as a Determinant of External Audit Fees and Factors Influencing this Contribution. *Journal of Accounting Research*, 39, 513-534.

Flesher, D.L. & Zanzig, J.S. (2000). Management accountants express a desire for change in the functioning of internal auditing. *Managerial Auditing Journal*, 15, 331-337.

Fowler, F.J. (2002). *Survey Research Methods*. Thousand Oaks Sage Publications.

Frank, W.G. (1979). An Empirical Analysis of International Accounting Principles. *Journal of Accounting Research*, 17, 593-605.

Government of Ethiopia. (1977). Establishment of the Audit Service Corporation. Proclamation No. 126/1977. Addis Ababa.

Government of Ethiopia. (1987). Powers and Duties of the Auditor General Proclamation No. 13/1987. Addis Ababa.

Government of Ethiopia. (1992). Public Enterprise proclamation, Berhanena Selam Printing Enterprise Proclamation No. 25/1992. Addis Ababa.

Gramling, A.A., Maletta, M., Schneider, A., & Church, B. (2004). The role of the internal audit function in corporate governance: a synthesis of the extant internal auditing literature and directions for future research. *Journal of Accounting Literature*, 23, 194-244.

Hair Jr., J.F., Anderson, R.E., Tatham, R.L. & Black, W.C. (1998). *Multivariate Data Analysis*. Upper Saddle River, New Jersey: Pearson Prentice Hall.

Hair Jr., J.F., Bush, R.P. & Ortinau, D.J. (2006). *Marketing research within a changing information environment* New Delhi: Tata McGraw-Hill Publishing Company Limited.

Haniffa, R.M. & Cooke, T.E. (2002). Culture, Corporate Governance and Disclosure in Malaysian Corporations. *Abacus*, 38, 317-349.

Haron, H., Chambers, A., Ramsi, R. & Ismail, I. (2004). The reliance of external auditors on internal auditors. *Managerial Auditing Journal,* 19, 1148-1159.

Institute of Internal Auditors. (2004). Definition of Internal Auditing. Institute of Internal Auditors. (2004), "Definition of Internal Auditing", available at: http://www.theiia.org/guidance/standards-and-guidance/ippf/definition-of-internal-auditing/?search=definition (accessed 07 April 2011).

Jensen, M.C. & Meckling, W.H. (1976). Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure. *Journal of Financial Economics*, 3, 305-360.

Kalbers, L.P. & Cenker, W.J. (2007). Organizational commitment and auditors in public accounting. *Managerial Auditing Journal*, 22, 354-375.

Kalbers, L.P. & Fogarty, T.J. (1995). Professionalism and Its Consequences: A Study of Internal Auditors. *Auditing: A Journal of Practice & Theory*, 14, 64-68.

Kerlinger, F.N. & Lee, H.B. (2000). *Foundations of Behavioral Research*. Philadelphia: Harcourt, Inc.

Krishnamoorthy, G. (2001). A cascaded inference model for evaluation of the Internal Audit Report. *Decision Sciences*, 32, 499-520.

Krishnamoorthy, G. (2002). A Multistage Approach to External Auditors' Evaluation of the Internal Audit Function. *Auditing: A Journal of Practice and Theory,* 21, 95-121.

Kwok, W.C.C. & Sharp, D.J. 1998. A Review of Construct Measurement Issues in Behavioral Accounting Research. *Journal of Accounting Literature*, 17, 231-254.

Lemessa, D. (1996). Auditors Independence and the Bidding Process. In: Seyoum, S. (Ed). *Inaugural Conference of the Ethiopian Accounting and Finance Association*. Addis Ababa, pp. 26-30.

Maletta, M.J. (1993). An examination of auditors' decisions to use internal auditors as assistants: The effect of inherent risk. *Contemporary Accounting Research,* 9, 508-525.

Margheim, L.L. (1986). Further Evidence on External Auditors' Reliance on Internal Auditors. *Journal of Accounting Research*, 24, 194-205.

Messier, W.F. & Schneider, A. (1988). A hierarchical approach to the external auditor's evaluation of the internal auditing function. *Contemporary Accounting Research*, 4, 337-353.

Mihret, DG. (2010). Factors Associated with Attributes of Internal Audit Departments: A Canonical Analysis, *African Journal of Accounting, Economics, Finance and Banking Research*, vol. 6, no. 6, pp. 42-61.

Mihret, DG, James, K & Mula, JM. (2010). Antecedents and organisational performance implications of internal audit effectiveness: some propositions and research agenda*, Pacific Accounting Review*, vol. 23, no. 3, pp. 224-52.

Mihret, D.G., James, K. & Mula, J.M. (2009). Accounting professionalization processes amidst alternating politico-economic order of Ethiopia. *Accounting and Finance Association of Australia and New Zealand*. AFAANZ conference, Adelaide, Australia.

Mihret, D.G., & Woldeyohannis, G.Z. 2008. Value-added role of internal audit: an Ethiopian case study. *Managerial Auditing Journal*, 23, 567-595.

Mihret, D.G., & Yismaw, A.W. (2007). Internal Audit Effectiveness: an Ethiopian public sector case study. *Managerial Auditing Journal*, 22, 470-484. .

Morrill, C. & Morrill, J. (2003). Internal auditors and the external audit: a transaction cost perspective. *Managerial Auditing Journal*, 18, 490-504.

Oppenheim, O.N. (1992). *Questionnaire Design, Interviewing and Attitude Measurement*. London: Printer Publishers.

Plumlee, R.D. (1985). The standard of objectivity for internal auditors: memory and bias effects. *Journal of Accounting Research*, 23, 683-699.

Privatization and Public Enterprises Supervisory Agency. (2004). Public Enterprises' Corporate Governance Directive. Addis Ababa.

Privatization and Public Enterprises Supervisory Agency. (2005a). Public Enterprises' Audit Committee Directive. Addis Ababa.

Privatization and Public Enterprises Supervisory Agency. (2005b). Public Enterprises Internal Audit Directive. Addis Ababa.

Ritchie, B. & Khorwat, E. (2007). The attitude of Libyan auditors to inherent control risk assessment. *The British Accounting Review*, 39, 39-59.

Roth, J. (2000). *Best Practices: Value-added Approaches of Four Innovative Auditing Departments*. Altamonte Springs, FL: The Institute of Internal Auditors Research Foundation.

Rusak, A. & Johnson, R. (2007). The Responsibilities of Audit Committees, in Jonson, R. (Ed.), *Readings in Auditing*. John Wiley & Sons Australia Ltd, Milton Qld.

Schneider, A. (1984). Modeling External Auditors' Evaluations of Internal Auditing. *Journal of Accounting Research*, 22, 657-678.

Schneider, A. (1985). The Reliance of External Auditors on the Internal Audit Function. *Journal of Accounting Research*, 23, 911-919.

Spraakman, G. (1997). Transaction cost economics: A theory of internal audit. *Managerial Auditing Journal*, 17, 323-330.

USAID. (2004). List of Approved Audit Firms. Available at http://www.docstoc.com/docs/675971/USAID-Regional-Inspector-General-Pretoria-s-List-of-Approved-Conditional-Status-Audit-Firms (accessed 17 March 2011).

Woldegiorgis, W. (1992). Education and Training of Internal Auditors in Ethiopia. *School of Business*. London: City University.

World Bank. (2005). Report on the observance of standards and codes (ROSC) Republic of Uganda Accounting and Auditing, available at http://www.worldbank.org/ifa/rosc_aa_uga.pdf.

World Bank. (2007). Report on the observance of standards and codes (ROSC) Ethiopia, available at http://www.worldbank.org/ifa/rosc_aa_ethiopia.pdf.

Notes

Note 1. There were 115 state-owned companies as of October 2008.

Note 2. The World Bank report (2007) indicates that as of July 2007, there were 4943 private companies in Ethiopia, most of these being small companies that are not required by law to be audited.

Note 3. Getachew Kassaye & Company, A.W. Thomas & Company, A.A. Bromhead & Company, Degefa Lemessa & Company, HST Chartered Certified Accountants, and Taddesse Woldegabriel & Company.

Note 4. Bradburn at al. (2003) explain that attitude and opinion and clearly. However they consider opinion as measurable on a single item and attitudes as a set of opinions. Similarly, Dornyei (2003) share the opinion that the two are not clearly distinguishable and point out that attitudes opinions are more factual.

Note 5. All the certified accountants were affiliated with the Association of Chartered Certified Accountants (ACCA), UK. Four of these respondents were also Certified Internal Auditors (CIAs), members of the Institute of Internal Auditors (IIA).

Note 6. All the certified accountants were affiliated with the Association of Chartered Certified Accountants (ACCA), UK. Four of these respondents were also Certified Internal Auditors (CIAs), members of the Institute of Internal Auditors.

Table 1(a). Mann-Whitney U test: Ranks

Type	Firm	N	Mean Rank	Sum of Ranks
Reliance	ASC	61	58.15	3547.00
	Private	58	61.95	3593.00
	Total	119		

Table 1(b). Mann-Whitney U test: Test Statistics[a]

	Reliance
Mann-Whitney U	1656.000
Wilcoxon W	3547.000
Z	-.647
Asymp. Sig. (2-tailed)	.517

a. Grouping Variable: Audit firm category

Table 2 (a). MANOVA Results: Levene's Test of Equality of Error Variances[a]

	F	df1	df2	Sig.
INDOB	3.853	1	82	.053
COMPE	3.853	1	82	.053
WORKP	2.025	1	82	.159
AUDITE	.242	1	82	.624
INHERI	.071	1	82	.790

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a   Design: Intercept + Epml

Table 2 (a). MANOVA Results: (b) multivariate Tests[b]

Effect		Value	F	Sig.
Intercept	Pillai's Trace	.952	390.544(a)	.000
	Wilks' Lambda	.048	390.544(a)	.000
	Hotelling's Trace	19.774	390.544(a)	.000
	Roy's Largest Root	19.774	390.544(a)	.000
Epml	Pillai's Trace	.079	1.691(a)	.160
	Wilks' Lambda	.921	1.691(a)	.160
	Hotelling's Trace	.086	1.691(a)	.160
	Roy's Largest Root	.086	1.691(a)	.160

a Exact statistic   b   Design: Intercept+Epml

Table 3 (a). Discriminant Analysis Results: Tests of Equality of Group Means

Box's M	1.250

Tests null hypothesis of equal population covariance matrices.

Table 3 (b). Discriminant Analysis Results: stepwise statistics: Variables Entered/Removed [a, b, c, d]

		Wilks' Lambda				Exact F					F to
Step	Entered	Statistic	df1	df2	df3	Statistic	df1	df2	Sig.	Tolerance	Remove
1	WORKP	.761	1	2	81.00	12.701	2	81.00	.000	1.000	12.701

At each step, the variable that minimizes the overall Wilks' Lambda is entered.

a. Maximum number of steps is 10.

b. Minimum partial F to enter is 3.84.

c. Maximum partial F to remove is 2.71.

d. F level, tolerance, or VIN insufficient for further computation.

Table 3 (c). Discriminant Analysis Results: summary of Canonical discriminant function: Standardized Canonical Discriminant Function Coefficients

Structure Matrix

	Function
Variable	1
WORKP	1.000
INDOB(a)	.600
COMPE(a)	.600
AUDITE(a)	.445
INHERI(a)	.234

Pooled within-groups correlations between discriminating variables and standardized canonical discriminant functions

Variables ordered by absolute size of correlation within function.

a   variable(s) not used in the analysis.

Table 3 (d). Discriminant Analysis Results: Classification Results [a]

Level of Reliance	Predicted Group Membership			Total	Hit ratio (%)
	No reliance	A little reliance	Moderate and high reliance		
No reliance	**14**	8	4	26	34.6
A Little reliance	17	**19**	18	54	46.3
Moderate and High reliance	7	10	**22**	39	31.8
Predicted group size	**38**	**37**	**44**	**119**	**46.2a**

[a] 46.2 per cent of original grouped cases correctly classified. [(14+19+22)/119] x 100

The Adoption of Mobile Commerce Service among Employed Mobile Phone Users in Bangladesh: Self-efficacy as A Moderator

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Abstract

Mobile commerce or better known as M-commerce is a fairly new phenomenon in the wake of the second technology wave from the famous E-commerce (electronic commerce) in the 21st century. As the Internet started to proliferate in many parts of the world, the mobile phone penetration in terms of voice communication started to grow rapidly. This simultaneous rapid growth has caused a new phenomenon of convergence of Internet computing and mobile communication where M-commerce has its root. M-commerce has the potential to enhance the work-life within the employed mobile phone users in Bangladesh. The purpose of this study is to examine whether awareness and knowledge, convenience of Mobile devices and WAP/GPRS enabled handsets, pricing and cost, security and privacy, rich and fast information, and perceived usefulness have any influence on the adoption of M-commerce among employed Mobile phone users in two major cities in Bangladesh – Dhaka and Chittagong. A survey method was used to collect data. The findings suggest that pricing and cost, rich and fast information, and security and privacy are significant predictors of the adoption of M-commerce. Self-efficacy is found to be a moderating factor for the adoption of M-commerce services.

Keywords: Mobile commerce, Adoption level, M-commerce services, Self-efficacy, Bangladesh

1. Introduction

The convergence of the two fastest growing industries – the internet and the mobile communication – has led to the creation of an emerging market for mobile commerce (M-commerce). Although the M-commerce market is relatively young, mobile online shopping is rapidly reaching a critical mass of businesses and individual users. In 2009, mobile online shopping increased more than threefold to $1.2 billion in the U.S. and exceeded $10 billion in Japan. By the end of 2010, M-commerce market in Europe is expected to outpace that in the U.S. Analysts expect that worldwide mobile online shopping will reach $119 billion in 2015 (ABIresearch, 2010). M-commerce contributes the potential to deliver the most of what the internet can offer plus the advantage of mobility.

M-commerce gives mobile communication devices such as mobile phones and personal digital assistants (PDA) the ability to pay for goods and services.

M-commerce is difficult to define and can be interpreted in a variety of ways. This is because M-commerce is a fairly new phenomenon and several definitions of it exist. M-commerce can be defined as "all activities related to a (potential) commercial transaction conducted through communication networks that interface with wireless devices". Another definition of M-commerce is "the use of wireless device to communicate, interact, and transact via high speed communication to the internet" (Shuster, 2001, p. 2). Angsana (2002) emphasizes on three elements of M-commerce – a range of activities, devices, and network types – and defines M-commerce as "all electronic transactions (e.g., communication interaction, purchase, payment) that use data-enabled wireless device connection to the internet or to a vendor's private network" (p. 8).

However, the real value of M-commerce lies in its ability to realize the tremendous business opportunity and address lifestyle issues prevalent in an aware, hyper-efficient, "on always" world. Mobile values or m-value signifies the value arising from the mobility of the new medium, i.e., making use of the internet connection while on the move. M-commerce has, in fact, been defined as "an e-commerce for users on the move" (Vitter-Pillippe and Navarro, 2000). With the relatively new emergence of M-commerce from the simple service of SMS to mobile payment, service vendors are cautious in introducing more complex transactions in providing alternative payment services so as not to oversell its potential. Some vendors have rolled out such services to the market on a very small scale and within a somewhat restricted environment. As the mobile commerce industry is still in its infancy, there are many unsolved problems related to its services. One major issue is the development of service that is able to support the diverse array of mobile devices and multiple networks, and provide a foolproof security to consumers. Furthermore, software and interface vary among different suppliers. Nevertheless, many industry and technology leaders are addressing these problems and thus M-commerce has a great potential as the era of wireless and mobility becomes a trend in the 21st century.

In Bangladesh, there is a growing number of wireless technology users in the area of M-commerce. There are more consumers who have a mobile phone than those who have a personal computer. Despite the rapidly growing number of mobile phone users in Bangladesh, M-commerce is a relatively new phenomenon in Bangladesh compared to other markets in Europe, the U.S., and the Asia Pacific. The M-commerce service providers in Bangladesh lack a clear direction toward understanding the factors affecting the adoption of M-commerce. Therefore, the objective of this study is to explore the factors that influence the adoption of M-commerce services among mobile users in Bangladesh.

The rest of the paper is organized as follows: a brief overview of the telecommunication industry in Bangladesh is presented followed by literature review, research model, proposed hypotheses, research methodology of the study, analyses and results, and discussion and conclusion of the major findings. We end the paper with a section on the limitations and future direction of the study.

2. Overview of the Telecommunication Industry in Bangladesh

Currently, there are six mobile phone operators offering their services to customers in Bangladesh. The total number of mobile phone subscribers has reached 43.7 million at the end of June of 2008 (BTRC, Annual Report, 2007-2008). GrameenPhone (GP) owned by Telenor (62%) and Grameen Telecom (38%) is the largest and the fastest growing cellular service provider in Bangladesh. BanglaLink is the second largest cellular service provider. It is a wholly owned subsidiary of Orascom Telecom. Aktel Malaysia International Bangladesh (TIMB) Limited is the 3rd largest cellular service provider in Bangladesh. It is a joint venture between Telecom Malaysia Sdn Bhd of Malaysia (70%) and a local company A.K. Khan & Company (30%). The fourth largest cellular sevice provider in Bangladesh is Warid Telecom International Ltd. Warid Telecom is a wholly owned subsidiary of Warid Telecom International LLC, Abu Dhabi. The other two mobile phone operators in Bangladesh are Citycell and Teletalk Bangladesh Ltd. Table 1 summarizes the number of mobile phone subscribers for these operators. Table 2 provides a summary of the value added service offered by mobile phone operators in Bangladesh.

3. Literature Review

The development of M-commerce started in a very unique way. Although the United States has more PCs per 100 inhabitants compared to many countries, it is far behind Europe and Asia with respect to cellular phone users (Haque, 2004). The popularity of mobile phone among Europeans and Asians has caused the transition of e-commerce from a PC-based internet service to a mobile phone internet service. Europe leads the mobile market and the M-commerce. A number of factors have contributed to Europe's position in leading the M-commerce market. These factors include favorable pricing structure, increasing competition in greater quality of service, and declining costs of network operators (Rao, 2002). However, in the emerging markets such as Africa, Asia Pacific, Latin America and the

Middle-East, the mobile market is expected to grow at a compounded annual growth rate (CAGA) of 16.2 percent. Asia Pacific is forecasted to be the world's largest market for mobile terminal with over 1.3 billion phone subscribers by 2010 (Gartner Dataquest, 2005).

3.1 M-commerce Services

The M-commerce services can be classified according to end user types such as B2C, C2C, and B2B. The majority of the existing mobile commerce services deal with an exchange of product, service or information in the B2C context (Panis *et al.*, 2001). These services include mobile financial service, user and location specific mobile advertising, mobile inventory management, wireless business re-engineering, and mobile interactive games. In addition to the device and wireless constraints, M-commerce is also impacted by the wireless infrastructure. The existing and future services of M-commerce include mobile banking service (e.g., check account information, money transfer), mobile trade service (e.g., stock quotes, selling/buying), credit card information (e.g., account balance), airline services (e.g., online reservation, timetable), travel, concert ticket reservation, sales, entertainment, news/information, database, and location based applications.

Since M-commerce is a fairly new phenomenon, several different types of services exist in the academic and practitioner literature. The list is still growing as new services are being recommended. According to Leung, Chan and Chan (2003), M-commerce applications are basically divided into three main types: (1) purchase of physical goods that requires some kinds of information distribution to complete the transaction, (2) purchase of services such as selling and buying stocks, and (3) information delivery such as news headline and stock market information. However, the mobile commerce services may be categorized into four main categories: (1) entertainment services (music, games, graphic, video and TV streaming), (2) communication services (short messaging, unified messaging, e-mail, chat rooms and video conferencing), (3) transaction services (banking, brokerage, shopping, auctions, betting, booking and reservations, mobile wallet, voting, and competition/contests), and (4) information services (news, city guide, directory service, maps, traffic and weather, corporate information, market data and mobile advertising).

3.2 Factors Affecting the Adoption of M-commerce Services

Adoption is an individual's decision to become a regular user of a product or a service. This study explores the factors that influence the adoption of M-commerce service among working employed users in Bangladesh. Numerous studies have been conducted around the world on the adoption of M-commerce (e.g., Jillbert and Khasawneh, 2003; Haque, 2004; Mariga, 2003; Huei, 2004; Bax and McGill, 2002; Vrechopoukis *et al.*, 2002). Jillbert and Khasawneh (2003) suggest that low risk, rich information, low cost, social influence awareness and user satisfaction are the significant predictors of the adoption of M-commerce services. Haque (2004) suggests that ease of use, portals and search engines, content with graphics and interactivity, packet switching technology and bandwidth, payment trust and legality, mobile commerce and web enable handsets, non intrusive personalization, timeless and cost effectiveness influence the adoption of M-commerce. Mariga (2003) posits that perceived usefulness, perceived ease of use, trust, and enjoyment is the significant determinant for the adoption of M-commerce services. Huei (2004) suggests that perceived usefulness, perceived ease of use, perceived risk, and cost is the influencing factors for the adoption of M-commerce. Bax and McGill (2002) suggest that perceived usefulness, computer self efficacy, computer anxiety, and internet self efficacy are the most important factors affecting the adoption of M-commerce. According to Vrechopoukis et al. (2002), the ease of user interface, security, customer service awareness, price, and comfort of device influence the adoption of M-commerce among customers.

3.3 Self-efficacy as a Moderator

According to Wooe and Bandura (1989), self-efficacy refers to "beliefs in one's capabilities to mobilize the motivation, cognitive resources, and courses of action needed to meet given situational demands". Perceived self-efficacy plays an important role in affecting motivation and behavior. The self-efficacy theory (Bandura, 1977) suggests that there are four source areas of information used by individuals when forming self-efficacy judgments. They are performance accomplishments, vicarious experience, verbal persuasion, and physiological state. Consumers who consider M-commerce too complex and believe that they will never be able to master the M-commerce technology will prefer to avoid them and are less likely to use them. Gist (1989) suggests that self-efficacy is an important motivational variable, influencing effort persistence and motivation. In addition, individuals who feel less capable of handling a situation may resist it because of their feelings of inadequacy or discomfort. On the other hand, individuals with high self-efficacy will perceive the use of M-commerce to be user friendly and easy to use due to the effect of self-efficacy on the degree of effort, the persistence and the level of learning (Bandura, 1977), and will be less resistant to changes. Hence, self-efficacy will affect beliefs and behavior of consumers adopting M-commerce services through either direct or indirect usage factors.

4. Research Model

The extant literature (e.g., Hossain and Prybutok, 2008; Jillbert and Khasawneh, 2003; Haque, 2004; Mariga, 2003; Huei, 2004; Bax and McGill, 2002; Vrechopoukis et al., 2002; Electronic Commerce Resource Center of Thailand, 2002; Davis, 1989) reveals that a number of factors impact the successful adoption of M-commerce. In consistent with the literature, this study posits that awareness and knowledge, convenience of mobile and WAP/GPRS enabled device, pricing and cost, security and privacy, rich and fast information, and perceived usefulness are the critical factors that impact the adoption of M-commerce. Self-efficiency is selected as the moderating variable based on Rosa, Marisa and Maria (2001). The research model is presented in Figure 1.

5. Hypotheses

As depicted in the research model (see Figure 1), we propose the following hypotheses:

5.1 Awareness and Knowledge

Jillbert and Ahmad (2003) conducted a study in Australia, and used the awareness and knowledge about the mobile commerce services as one of the factors affecting the adoption of M-commerce services. Based on this study, we formulate the following hypothesis:

H1: Consumers with a high awareness and knowledge of M-commerce services will be more likely to adopt M-commerce services.

5.2 Convenience

People tend to adopt a technology if they perceive that the technology makes their life more convenient. (Hossain and Prybutok, 2008). Tang and Veijalinen (2001) assert that the main force for rapid acceptance rate of M-commerce is its increasing convenience and efficiency in performing simple transactions compared with the stationary machines. However, the comfort level of using the input mechanisms, screen resolution, and screen size of the mobile phones are critical physical make-up of the mobile phone which makes it easier for the user to navigate and perform any M-commerce transaction. In addition, having WAP/GPRS enabled in the mobile phone plays a critical role in enabling M-commerce applications. Thus, we propose the following hypothesis:

H2: Convenience of mobile and WAP/GPRS enabled devices will increase the likelihood of consumer adoption of M-commerce services.

5.3 Cost and Pricing

Heinonen (2002) conducted a study on the acceptance of mobile services and suggests that the pricing of the M-commerce services is one of the most significant factors affecting the use of mobile services. The research findings from Swedish market also posit that too high prices for the mobile services hinder the use of those services. Following this argument, the following hypothesis can be proposed:

H3: The lower the cost and pricing of using M-commerce service the more likely the services will be adopted.

5.4 Security

Consumer acceptance of a technology is influenced by how consumers view the importance of security and how willing they are to sacrifice security against the benefits derived from the use of the technology (Hossain and Prybutok, 2008). Therefore, the lack of wireless security standard and practices could inhibit the rapid adoption of M-commerce in the region. Thus, the following hypothesis is proposed:

H4: The lower the perceived risk from security issues of using mobile commerce services the more likely the service will be adopted.

5.5 Rich and Fast Information

Jellbert and Ahmad (2003) suggest that the minimal textual display on the mobile devices is one of the reasons that can lead to the introduction of other inhibitors to M-commerce adoption. Furthermore, the speed and timeliness of getting the information is also important for users to adopt M-commerce services. Thus, the following hypotheses can be postulated:

H5: The higher the perception of rich and fast information the more likely the adoption of M-commerce services among consumers.

5.6 Usefulness

The Technology Acceptance Model (TAM) is one of the most influential extensions of Ajzen and Fishbern's Theory of Reasoned Actions (TRA) in the information system literature. TAM used the generic Fishbein and Ajzen's TRA model (Fishbein & Ajzen, 1975) to the particular domain of user acceptance of computer technology, replacing the

TRA's attitudinal determinants with two specific behavioral beliefs: perceived ease of use and perceived usefulness in a technology acceptance measures. Perceived usefulness is defined as "the degree to which a person believes that using a particular system would enhance his or her productivity" (Davis, 1989, p. 320). Huei (2004) posits perceived usefulness has a significant positive influence on the acceptance of the wireless computing devices. This factor was also used by Bax and McGill (2002) in their study on Web Application on Mobile Computing, where Perceived Usefulness was used as an independent variable. These suggest that people who perceive the wireless computing devices are useful tend to accept the wireless computing devices.

H6: The Perceived Usefulness in M-commerce services has a significant influence in the adoption of M-commerce services.

5.7 Self-efficacy

Rosa, Marisa and Maria (2001) found the moderator effect of self-efficacy on occupational stress. They examined self-efficacy as a moderator and found that self-efficacy moderates the stress-strain relationship, suggesting that low level of self-efficacy is related to high level of occupational stress in adopting new technology. We, therefore, posit that the degree of self-efficacy of a consumer will have a moderating effect on the adoption of M-commerce services. The following hypotheses are proposed to test the moderating effects of self-efficacy on the relationships between the independent variables and dependent variable.

H7: The positive relationship between awareness and knowledge, and intention will be stronger when self efficacy is higher.

H8: The positive relationship between Convenience of Mobile Devices and WAP/GPRS enabled handset, and intention will be stronger when self efficacy is higher.

H9: The positive relationship between Pricing and Cost, and intention will be stronger when self efficacy is higher.

H10: The positive relationship between Security and Privacy, and intention will be stronger when self efficacy is higher.

H11: The positive relationship between Rich and Fast information, and intention will be stronger when self efficacy is higher.

H12: The positive relationship between Perceived Usefulness and intention will be stronger when self efficacy is higher.

6. Research Methodology

A survey method was used to collect the data for the study. The instrument was developed from an earlier work by Loh (2004). The items were adapted to suit an audience more familiar with the actual situation in Bangladesh. Initial pilot testing was performed on a limited audience to verify that the modifications do not adversely affect the validity of the questionnaire. A total of 40 responses were received for the pilot test. The findings of the pilot test were used to finalize the instrument. The survey was administered to various working segments in Dhaka and Chittagong – two major cities of Bangladesh. Primary means of distribution was the hardcopy delivery of the survey questionnaires. Participants were chosen at random. The questionnaires were distributed after meeting the recipients and informing them the objectives of the survey. One hundred and ten questionnaires were distributed and collected over a three weeks time period.

7. Analyses and Results

A total of 110 questionnaires were distributed. Of 110 questionnaires, 100 were completed in full. Ten questionnaires were rejected as they were not fully answered. The respondents consisted of various age groups and levels of education. Four percent of the respondents were at the ages of 20 years and below, 42% between the ages of 21-30 years, 34% between the ages of 31-40 years, 14% between the ages of 41-50 years, and 6% were at the ages of 51 years and above. Respondents' level of education was as follows: 11% had secondary education, 28% had some diploma degree, 54% had a bachelor's degree, 6% had a Master's degree, and 1% had a Ph.D. degree. Twenty one percent of the respondents came from the Garments industry, 26% from Education, 17% from Wholesale and Retail, 20% from Hotel and Restaurant, 7% from Printing and Communication, 4% from Public Administration, and 5% from Health and Medical services.

7.1 Reliability Analysis

The reliability of the factors was checked using Cronbach's alpha. A Cronbach's alpha of 0.65 or higher [Nunnally 1978] was used as an acceptable value for internal consistency of the measures. The Cronbach's alpha of the dependent variable (Adoption of M-commerce) is 0.72. The Cronbach's alphas for independent variables range from

0.70 to 0.88. These values support the contention that all the factors had adequate reliability. The reliabilities of the factors are shown in Tables 3.

7.2 Regression Analyses

Regression Analyses were used to test the proposed hypotheses. This study has one dependent variable, six independent variables, and one moderating variable. Summated scores of the respective factors were used to obtain the scores for all the measures. The runs test, Levene's test and Kolmogorov-Smirnov tests were conducted to test for randomness, constancy of variance, and normality, respectively. These tests show that there is no evidence of violation of the assumptions underlying multiple regression analysis. Also, there is no evidence of multicollinearity because the VIFs and condition indices are within acceptable levels. Table 4 presents the results of the regression analyses. The coefficient of R^2 is 0.430 indicating that all the independent variables account for 43% of the variance in adoption of M-commerce. Durbin Watson of 2.010 indicates there is no auto-correlation problem.

The results of multiple regression analyses (Table 4) show that pricing and cost, rich and fast information, and security and privacy are significant predictors of adoption of M-commerce. These findings support three hypotheses (H3, H4, and H5). The results also show insufficient evidence for support of three hypotheses (H1, H2, and H6), suggesting that awareness and knowledge, convenience of mobile and WAP/GPRS devices, and perceived usefulness play insignificant roles in predicting the adoption of M-commerce.

The overall summary of the analysis for the moderating variable, self-efficacy, is also shown in Table 4. The R^2 value is 0.430 when no moderating variable is taken into account. This value increases to 0.548 when self-efficacy is considered as a moderator. The increase implies that the moderating variable contributes to strengthen the relationship between the independent variables and dependent variable. This means that self-efficacy when included as a moderator the model is able to explain 54.8% of the variance in the dependable variable – adoption of M-commerce. The significance of the moderating variable of self-efficacy on the dependent variable is found to be high (p value= 0.013). The beta term for this moderated model between self-efficacy, and rich and fast information was found to be significant at 0.042. This significant value implies that self-efficacy moderates the relationship between rich and fast information, and adoption of M-commerce services. This supports H11 that states that self-Efficacy has a significant moderating effect on the relationship between rich and fast information, and the adoption of M-commerce services.

However, the effect of sself-efficacy does not significantly moderate the relationships between (1) awareness & knowledge (p value =0.214) and the adoption of M-commerce services, (2) convenience of mobile and WAP/GPRS enabled devices (p value =0.256) and the adoption of M-commerce services, (3) pricing & cost (p value =0.458) and the adoption of M-commerce services, (4) security & privacy (p value =0.984) and the adoption of M-commerce services, and (5) perceived usefulness (p value =0.278) and the adoption of M-commerce services. We, therefore, reject hypotheses H7, H8, H9, H10 and H12.

8. Discussion and Conclusion

This study posited that the factors influencing the adoption of M-commerce were awareness and knowledge, convenience of mobile devices and WAP/GPRS enabled handsets, pricing and cost, security and privacy, rich and fast information, and perceived usefulness.

The degree of awareness and knowledge was not related as a critical factor to the adoption of M-commerce services in Bangladesh. This finding is contrary to the findings of various studies (e.g., Julias and Khasawneh, 2003; Electronic Commerce Resource Center of Thailand, 2002; Vrechopoukis et al., 2002). Awareness could encompass marketing and education in relation to the product, peer influence which creates the awareness, customer services provided by the company to educate users and consumer self-learning in attaining the knowledge. However, Awareness and Knowledge of M-commerce services is not an important factor in the context of adoption of M-commerce services among employed mobile phone users in Bangladesh.

A significant finding of this study is that the convenience of mobile and WAP/GPRS enabled devices does not have a significant impact towards the adoption of M-commerce services. This partially contradicts the findings of many studies (e.g., Haque, 2004; Electronic Commerce Resource Center of Thailand, 2002; Vrechopoukis et al., 2002) that suggest that the convenience of mobile and WAP/GPRS enabled devices is a key factor of adoption.

The result of this study suggests that the pricing and cost is a significant factor of the adoption of M-commerce services. This supports several previous studies (e.g., Jillbert and Ahmad, 2003; Haque, 2004; Electronic Commerce Resource Center of Thailand, 2002; Vrechopoukis et al., 2002), in which researchers have found that the pricing and cost is the highest or commonly used factor to determine the adoption of M-commerce services.

This study suggests that the security and privacy is a significant factor of the adoption of M-commerce services.

This is supported by various previous studies such as Jillbert and Ahmad (2003), Haque (2004), Vrechopoukis et al. (2002), Mariga (2003), and Huei (2004).

The rich and first information is found to be strongly correlated to the adoption of M-commerce services. This supports the findings by Jillbert and Ahmad (2003), Electronic Commerce Resource Center of Thailand (2002), Haque (2004), and Anckar and D'Incau (2002).

Perceived usefulness was not found to be an important factor in influencing people to adopt M-commerce services. This contradicts the findings by Jillbert and Ahmad (2003), Mariga (2003), Huei (2004), and Saga and Zmud (1984).

Self-efficacy has a positive moderating effect on the relationship between the rich & fast information and the adoption of M-commerce services. It has no significant moderating effect on the relationships of the rest of the independent variables – Awareness and knowledge, Convenience of mobile devices, Pricing & Cost, Security & Privacy and Perceived Usefulness – with the dependent variable – Adoption of M-commerce services.

9. Limitations and Future Direction

In this study, our objective was to investigate the major factors influencing the adoption of M-commerce services among mobile users in Bangladesh with the moderating effect of self-efficacy. Although the factors identified in this study were based on the extant literature, we acknowledge that future studies may look at more related constructs to form a more comprehensive picture of the adoption of M-commerce services in Bangladesh. Similarly, future studies may also include more moderating and/or mediating constructs to the model presented in this paper.

This study provides future researcher with several avenues. Future work can examine whether the gender difference has any significant influence on the M-commerce adoption level. Further, researchers can also attempt to investigate the moderating effects of different age groups of the user on the M-commerce adoption in Bangladesh. We hope this study provides an impetus for researchers to continue investigation in this area.

References

ABIresearch. (2010). Shopping by Mobile will Grow to $119 Billion in 2015, *ABIresearch: Technology Market Intelligence*, February 16, 2010. Accessed online on July 15, 2010 from http://www.abiresearch.com/press/1605-Shopping+by+Mobile+Will+Grow+to+%24119+Billion+in+2015.

Anckar, B. & D'Incau, D. (2002). Value-Added Services in Mobile Commerce: An Analytical Framework and Empirical Findings from a National Consumer Survey.

Angsana, A. T. (2002). International diffusion of M-commerce: A Coupled-hazard approach, *Thesis written at University of Minnesota for the Department of Information and Decision Sciences Carlson School of Management*.

Bandura, A. (1977). Self-Efficacy: Toward a unifying theory of behavioral change, *Psychology Review,* Vol. 84: 191-215.

Bax, S., and McGill, T.J. (2003). Predicting web page development success: An exploratory study*, 14th Australasian Conference on Information Systems*, 26-28 November, Perth, W.A.

Davis, F.D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology, *MIS Quart.*, Vol. 13: 318-339.

Fishbein, M., and Ajzen, I. (1975). *Belief, attitude, intention and behavior: An introduction to theory and behavior*, Addison-Wesley, Reading, MA.

Gartner Dataquest (2005). Forecast: Mobile terminals, worldwide, 2000-2009, *Gartner Dataquest*, July 18, 2005. Accessed online on July 4, 2008 from http://www.gartner.com/DisplayDocument?id=483696.

Gist, M.E. (1989). The influence of training method of Self-Efficacy and idea generation among managers, *Pers. Psychology,* Vol. 42: 787-805.

Haque, A., 92004). Mobile commerce: Customer perception and its prospect on business operation in Malaysia, *The Journal of American Academy of Business,* Cambridge, March 2004.

Heinonen, K., 92002). Acceptance of mobile services-insight from the Swedish market for mobile telephony, SSE/EFI Working Paper Series in Business Administration No 2002: 16.

Hossain, M.M., and Prybutok, V.R. (2008). Consumer Acceptance of RFID Technology: An Exploratory Study, *IEEE Transactions on Engineering Management*, Vol. 55, No. 2: 316-328.

Huei, P.V. (2004). The study on the acceptance of wireless computing devices among consumers in Penang, *Unpublished MBA thesis*, Nottingham Trent University. Olympia College, Penang, Malaysia.

Jillbert, J. and Ahmad, K. (2003). Adoption, diffusion, use and impact of m-commerce within campus community: a survey of international students, *Proceedings of the 15th Annual SPUSC 2003: The Drive to be Different*, Newcastle University, Australia.

Kotler, P. (2002). *Marketing Management.* The Millennium edition (10th ed.). Prentice Hall International, Inc.

Leung, C.H., Chan, Y.Y., & Chan, C. (2003). Analysis of Mobile Commerce, Hong Kong ACM 1-58113-788-5/03/09 ICEC, Pittsburgh, PA.

Lewis, D., & Bridger, D. (2000). *The soul of the new consumer: Authenticity – what we buy and why in the new economy,* Nicolas Brealey Publishing, London.

Loh, S. (2004). *M-commerce Survey.* Retrieved December 30, 2004 from http://unsw.fissure.org/mcomm/.

Mariga, J. R. (2003). Managing E-Commerce and Mobile Computing Technologies, Purdue University. USA.

Nunnally, J.C. (1978). *Psychometric theory*, Second edition, McGraw-Hill, New York.

Panis, S., Morphis, N., Felt, E., Reufenheuser, B., Bohm, A. and Nitz, J. (2001). Mobile commerce service scenarios and related business models, *EURESCOM project P1102 eMpoiro,* Cyprus Telecommunications Authority, T-Systems Nova, Germany and Elisa Communications Corporation, Finland.

Rao, M. (2004). EM-Wire: E-Commerce, M-commerce poised for rapid take-off in Europe, *Electronic Markets: The International Journal of Electronic Commerce & Business Media*, April 6, 2002. Retrieved September 22, 2004 from http://www.electronicmarket.com.

Rettie, R., & Brum, M.M. (2001). M-commerce: The role of SMS text messages, *Thesis from Kingston University.* UK.

Rosa, G., Marisa, S., & Maria, J.P. (2001). Moderator effects of self-efficacy on occupational stress, *Psychology in Spain*, Vol. 5, No. 1: 63-74.

Saga, V.L., & Zmud, R.W. (1994). The nature and determinations of IT acceptance, routinization and infusion, *Proceedings of the IFIP TC8 working conference on diffusion, transfer and implementation of information technology*. North Holland.

Saljoughi, F. (2002). Adoption of M-commerce, Master thesis, Information and Communication Technology, Agder University College in Grimstad, Norway.

Shuster, T. (2001). Pocket internet and m-commerce: How will it fly? *Working paper,* George Washington University, Washington, DC.

Tang, J., & Veijalainen, J. (2001). Using Agents to Improve Security and Convenience in Mobile E-Commerce, *Proceedings of the 34th Hawaii International Conference of System Sciences,* IEEE Computer Society Press, Los Alamitos.

Vittet-Philippe, P. & Navarro, J.M. (2009). Mobile e-business (M-commerce): State of play and implication for European enterprise policy, *European Commission Enterprise Directorate-General E-Business Report,* December 6, 2000. Accessed online on August 21, 2009 from www.ncits.org/tc_home/v3htm/v301008.pdf.

Vrechopoukis, A. P., Constanton, F.D. & Sideris, I. (2004). Strategic marketing planning for mobile commerce diffusion and consumer adoption, *The eBusiness Center, Department of Management Science and Technology, Athens University of Economics and Business.* Retrieved October 12, 2004 from http://www.eltrun.aueb.gr/cvs/sideris/mCommerce_Diffusion.pdf.

Wooe, R.E., & Bandura, A. (1989). Impact of conceptions of ability of self-regulatory mechanisms and complex decision making, *Journal Pers. Social Psychology,* Vol. 56: 407-415.

Table 1. Mobile phone subscribers in Bangladesh (Up to April, 2009)

Mobile Operator	No. of Subscribers (in Millions)
Grameen Phone Ltd. (GP)	20.31
Banglalink	9.46
Aktel	7.85
Citycell	1.70
Teletalk Bangladesh Ltd.	1.07
Warid Telecom International	3.31
Total	**43.70**

Table 2. M-commerce services offered by mobile phone operators in Bangladesh

Service	Aktel	Bangla Link	Citycell	Grameen Phone	Tele Talk	Warid Telecom
FnF (Friends and Family)	Yes	Yes	Yes	Yes	Yes	Yes
SMS	Yes	Yes	Yes	Yes	Yes	Yes
International SMS	Yes	Yes	Yes	Yes	Yes	Yes
Internet SMS	N/A	N/A	N/A	Yes	Yes	N/A
Voice SMS	Yes	Yes	Yes	Yes	Yes	Yes
Voice Mail	Yes	Yes	Yes	Yes	Yes	Yes
Voice Chatting	N/A	Yes	Yes	N/A	N/A	N/A
SMS Chatting	Yes	Yes	N/A	Yes	N/A	N/A
SMS E-mail	Yes	Yes	Yes	Yes	Yes	Yes
GPRS/EDGE Internet	Yes	Yes	Yes	Yes	Yes	Yes
WAP	Yes	Yes	Yes	Yes	Yes	Yes
MMS	Yes	Yes	Yes	Yes	Yes	Yes
Instant Recharging	Yes	Yes	Yes	Yes	Yes	Yes
Call Back Service	N/A	Yes	N/A	Yes	N/A	N/A
Welcome Tunes	Yes	Yes	Yes	Yes	N/A	Yes
Song Dedication	Yes	Yes	Yes	N/A	N/A	N/A
Voice Based Service	Yes	Yes	N/A	Yes	Yes	Yes
Missed Call Alert	Yes	Yes	N/A	Yes	N/A	Yes
Push-Pull Service	Yes	Yes	Yes	Yes	Yes	Yes
Power Menu	Yes	Yes	N/A	N/A	N/A	N/A
International Roaming	Yes	Yes	Yes	Yes	Yes	Yes
Economy ISD	Yes	Yes	Yes	Yes	Yes	Yes
Online Customer Care	Yes	Yes	Yes	Yes	N/A	N/A

Table 3. Summary of Reliability Analysis

Variables	Number of items	Items deleted	Cronbach's alpha
Awareness and Knowledge	5	None	0.74
Convenience of Mobile Devices and WAP/GPRS	5	None	0.88
Pricing and Cost	5	None	0.77
Security and Privacy	5	None	0.77
Rich and Fast information	5	None	0.70
Perceived Usefulness	5	None	0.85
Self-Efficacy	5	None	0.83
Adoption of M-commerce	5	None	0.72

Table 4. Results of Hierarchical Regression Analyses

| Variables	Beta	t-values	Significance
Model 1			
Awareness and Knowledge	0.098	2.619	0.295
Convenience of Mobile Devices and WAP/GPRS enabled	0.103	1.033	0.304
Pricing and Cost	0.321	3.428	0.001*
Security and Privacy	0.205	2.033	0.045*
Rich and Fast information	0.263	2.745	0.007*
Perceived Usefulness	-0.100	-1.003	0.318
Model 2			
Awareness and Knowledge	0.272	2.383	0.019*
Convenience of Mobile Devices and WAP/GPRS enabled	0.045	0.483	0.630
Pricing and Cost	0.036	0.460	0.647
Security and Privacy	0.052	0.505	0.615
Rich and Fast information	0.257	2.492	0.014*
Perceived Usefulness	0.272	2.646	0.010*
Self-efficacy	0.292	2.544	0.013*
Self-efficacy - Awareness and Knowledge	-0.781	-1.252	0.214
Self-efficacy - Convenience of Mobile Devices and WAP/GPRS enabled	0.645	1.144	0.256
Self-efficacy - Pricing and Cost	0.348	0.746	0.458
Self-efficacy - Security and Privacy	-0.010	-0.020	0.948
Self-efficacy- Rich and Fast information	1.421	2.066	0.042*
Self-efficacy- Perceived Usefulness	-0.729	-1.093	0.278
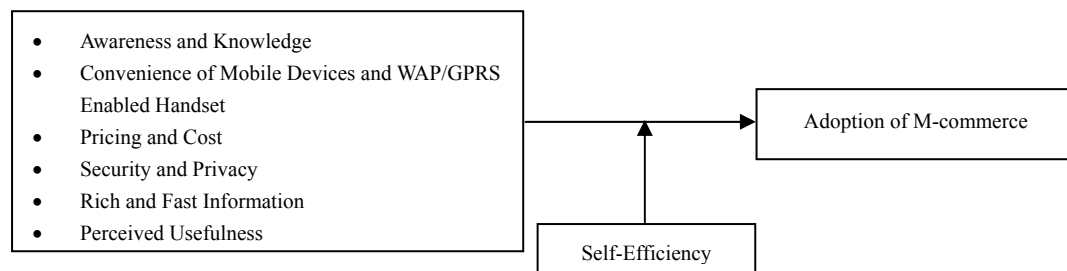
Figure 1. Research Model for the Adoption of M-commerce

Research on the Asset-Backed Securitization Financing of Large Stadium

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Abstract

Along with the maturity and standardization of market, the asset-backed securitization financing is penetrating into the construction and operation of stadium, especially for the large stadium. In this paper, authors analyze the procedures of asset-backed securitization financing for stadium and the current situations, and put forward policy suggestions for the asset-backed securitization financing of large stadium in China.

Keywords: Large stadium, Asset-backed securitization, Financing

Asset-backed securitization refers to as ABS in the field. In this financing mode, the asset that lacks liquidity but generates cash flow can be transformed into transactional securities in finance market by structural reengineering, which can achieve the financing mainly by means of issuing bonds and asset- backed securities. At present, many countries have applied this kind of financing to the construction of urban infrastructure and stadium. The size and the nature of large stadium make it need more funds. A multi-channel financing is necessary. Besides, the post-operation of large stadium also needs a stable cash flow as the guarantee. Presently, in China the practical conditions and theoretical bases are the asset-backed securitization financing of large stadium.

1. The process of asset-backed securitization financing of stadium

The asset-backed securitization financing of stadium is a financing method in order to collect funds for the construction of stadium by means of issuing bonds in finance market, taking the charges for using the stadium and facilities as the base, and the future return or the official taxation as a guarantee.

The process of asset-backed securitization financing of stadium is: the sponsor sells the securitized stadium assets (such as membership income, TV right fee, naming right fee, rents, ads income, etc.) to the Special Purpose Vehicle (SPV), or the SPV buys in the securitized stadium assets actively, and collects these assets into an asset pool, then finances by issuing securities in financial market with the support of cash flow generated by the asset pool, finally pays off all issued securities with the cash flow. If the cash flow generated by the asset pool fails to pay off all issued securities, under some special conditions (such as the bonds are guaranteed by the government), the government will pay off these securities with taxes (Yanyang Jiang & Yubo Xie & Chunlin Deng, 2005, p173). See Figure 1.

2. Present conditions of the asset-backed securitization financing of stadium

In The United States, theories of asset-backed securitization financing of stadium and practices are highly developed. According to the Fitch Raings Company's grading securities of 38 units (23 government financing, 15 private financing), with the total sum 6 billion US dollars used for the construction of stadium and re-financing, 3.5 billion US dollars are from 23 tax-supported government security financing, and other 2.5 billion US dollars from 15 independent project financing or asset- backed stadium financing. Municipal bonds are always important in the American stadium financing. Almost all stadiums' financing includes the tax-supported municipal bonds and the income-backed securities. Obviously, the asset-backed securitization financing of stadium, as a new financing tool, is popular in practice and results in wonderful effects.

Domestic researches concerning the asset-backed securitization financing of stadium mainly focus on two aspects. The first is to study the asset-backed securitization financing in the country with developed sports industry, such as the United States, and learn from the experiences. For example, Chengjun Ju and Junying Lian (2007) analyze the advantages of asset-backed securitization financing of stadium in the United States, and suggest that the biggest problem of Chinese stadium financing is the simple financing structure. Objectively, China has the conditions for achieving the asset-backed securitization financing of stadium. We can learn from the United States, associating the construction of stadium with capital market, breaking the institutional barrier, and promoting the diversified development of stadium financing. Lingxiang Guan and Yongsong Zhou (2008) summarize the main channels for

financing of foreign professional sports clubs, such as bond financing, equity financing, asset-backed securitization, and mention that foreign professional clubs have various financing channels, and rich experiences. We should learn from their experiences, and broaden the financing channels for the financing of professional sports clubs in China. The second is to study the advantages and disadvantages of asset-backed securitization financing of Chinese stadium. For example, Yanyang Jiang, Yubo Xie, and Chunlin Deng (2006) point out the advantages of asset-backed securitization financing of stadium are mainly lower financing costs than bank loans, lower financing risks, and lower risks of investors. The enlightenments from the asset-backed securitization financing of stadium in foreign countries are: we should issue general obligation bonds, unsecured debts, and asset-backed securities. Mei Wang and Liang Chen agree that today the construction of large stadium is in a dilemma with lagged behind government investment and social financing market malfunction. The institutional causes are immature exterior environment of market system and narrow construction objectives. The non-institutional causes are the characteristics of stadium and the lack of financing innovation. Relevant solution must be based on institutional innovation for stadium financing, insisting on the principle of effectiveness, enlarging and deepening the financing channels, construction projects, and operational products. The government should make up relevant policies to support the financing of stadium.

Generally speaking, we are still at the initial research stage concerning the asset-backed securitization financing of stadium in China. In recent years, the construction and operation of large stadium in China have adopted diversified financing. For example, for the construction and operation of stadiums for the 2008 Beijing Olympic Games, the PPP mode is for the construction of National Stadium, the BOT for the National Indoor Stadium and Olympic Village, donations from Hong Kong, Macao, and Taiwan for National Swimming Center, and the city government makes up the insufficient parts. All of them have tried to enlarge the stadium financing and achieved temporary fruits. However, compared with the United States, Australia, and some European countries with developed sports industry, these financing modes (PPP mode, BOT mode, etc.) are too simple and narrower.

3. Policy suggestions for asset-backed securitization financing of large stadium in China

3.1 Build a government-dominated stadium asset-backed securitization financing market

Compared with other financing ways, the stadium asset-backed securitization financing has lower costs and risks. Meanwhile, the self financing of stadium can get the support from the government. The stadiums for the 2008 Beijing Olympic Games have successfully tried different financing, what serve as valuable experiences. Therefore, to develop the asset-backed securitization financing of stadium, we should give full play to the advantage of low cost and risk, seize chances, and make best use of state policy support. At the initial development stage of stadium asset-backed securitization financing in China, the government should promote and support its development, by means of making up preferential policies, relevant laws, and supervision system, building a safe market system and transaction planning, performing financial regulatory and risk control by following the international practice, providing a relatively complete and regulatory environment for stadium asset-backed securitization financing, which includes the accounting system, the credit rating system, the financial guarantee system, and the taxation system, and regulating the choice of issuers, the conditions for issue of securities, the financial supervision, and risk control. In short, in order to promote the development of stadium asset-backed securitization financing in China, we should set up a government-dominated security guarantee or insurance, unify the guaranty application and contract, build a government- dominated stadium asset-backed securitization financing market, creating favorable conditions for the asset-backed securitization financing of stadium. Because of problems, such as the constraints of present sports system, the imperfect market system, and undeveloped financial market, for the asset- backed securitization financing of stadium, the governments at all levels have to issue bonds to improve the credit rating of stadium, escaping from threats from sports system, and sports market mechanism.

3.2 Train amounts of institutional investors and open the stadium asset-backed securitization financing market to institutional investors

Institutional investors have been the more important components in the capital market of sports industry in world developed countries. Institutional investors are the engines and sources for the liquidity of sports industry asset-backed securitization market. Therefore, with the precondition of the government strengthening the regulatory, the government must train the institutional investors who participate into the construction and operation of stadium and care about the development of sports industry, permit them enter the stadium asset-backed securitization market, and make them the real investment subjects of sports industry asset-backed securitization market. Because of the complexity of stadium asset-backed securitization financing, it is hard to make the giant stadium asset-backed securitization financing market work with personal funds. So, the training and entrance of institutional investors are very important for the asset-backed securitization financing of stadium in China.

3.3 Build an effective talent-market management mechanism

The asset-backed securitization financing of stadium is a complex systematic project. In order to develop the stadium asset-backed securitization financing, we must introduce and train amounts of professional talents for managing and operating stadiums, improving present operations of stadiums, and guaranteeing the post cash flow. Meanwhile, we must establish the effective and reasonable employment mechanism, form the people-oriented management philosophy, rely on the market, recruit more capable people from the society, train and choose a group of experts who possess strategic insights, know about the financial market, sports industry, sports laws, and sports management, and excellent composite talents, insuring the orderly and effective operation of stadium asset-backed securitization financing in China. Also, we should cultivate sports entrepreneurs with the ability of asset-backed securitization market operation, achieving the innovation of sports industry's financing system, and establishing the incentive and constraint mechanism for the market operation of asset- backed securitization financing in sports industry in China.

4. Conclusion

Compared with the PPP mode and the BOT mode, the ABS financing mode involves with few stages, which reduces costs to a great degree. For the construction of large stadium, this financing mode means that the stadium has been profitable before it has been completed, turning fixed assets into circular securities. In China, because of the development of market economy, the construction of large stadium should adopt the diversified financing mode. We can learn from foreign countries' successful ABS financing modes and relevant studies serve as theoretical bases and intellectual supports. For the construction and operation of stadium, the main policy suggestions for the ABS financing mode are: build a government-dominated stadium asset-backed securitization market, train institutional investors and approve their entrance into the market, open the market to institutional investors, and set up the effective personnel market management mechanism.

References

Guan, Lingxiang & Zhou, Yongsong. (2008). The enlightenments of main financing ways of foreign professional sports club. *Market Modernization.* No.1. p156-157.

Jiang, Yanyang. Xie, Yubo & Deng, Chunlin. (2005). On the asset-backed securitization financing of stadium. *Market Modernization.* No.5. p173.

Ju, Chengjun & Lian, Junying. (2007). Research on the asset-backed securitization financing of stadium in the United States. *Shanxi Sports Science and Technology*. No.8. 69-71.

Wang, Mei & Chen, Liang. (2008). The cause analysis and countermeasures of financing market malfunction of large-scale sports stadium in China. *Journal of Tianjin University of Sports*. No.4. p360-364.
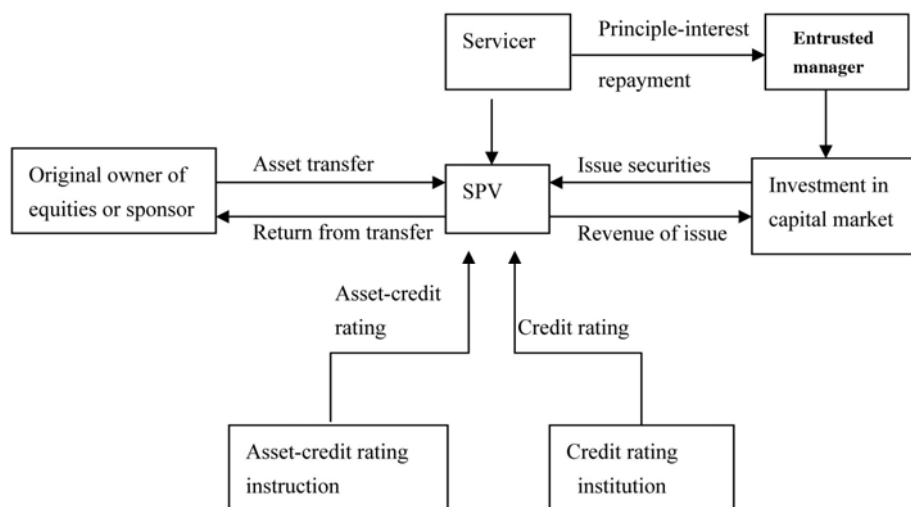
Figure 1. The ABS Financing Process for the Construction of Stadium

Examining the Critical Factors Affecting the Repayment of Microcredit Provided by Amanah Ikhtiar Malaysia

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Abstract

This study employs a cross sectional design with stratified random sampling method to examine how common household factors affect repayment performance of Amanah Ikhtiar Malaysia (AIM)'s hardcore poor microcredit program clients in Peninsular Malaysia. This study designed and tested a structural equation model to investigate how uses of loan, household income, number of gainfully employed members, number of sources of income and total savings affect repayment performance. Findings of this study show a significant model fit and negative linear relationship between repayment problem with uses of loan in income generating activities, household income, number of gainfully employed members, and number of sources of income. AIM should therefore focus on designing and providing appropriate training and development programs to enable the hardcore poor households' ability to use credit in income generating activities, grasp employment generating opportunities as well as find and invest in new income generating activities.

Keywords: Microcredit, Repayment Performance, Amanah Ikhtiar Malaysia

1. Introduction

Group based microcredit program is one of the most important innovations in development policy in the last fifty years (Guttman, 2007). The group based microcredit program allows borrowers who cannot provide collateral, to form their own group where members are mutually liable for each others repayments although loans are provided to individual. Since MFO's agree not to take any legal action against defaulters, the only instrument they have against loan defaulters is joint liability, where if any member is unable to repay, other group members cannot borrow unless they assist in repaying defaulters debt. Ghatak (1999) mentioned that group lending programs provide an opportunity for the MFO's to distinguish good borrowers from the risky one. This joint liability feature of group based microcredit program attracts the attention of development communities because of its ability improve repayment performance which allows MFO's to achieve institutional financial sufficiency (IFS) and reaching large number of poor and hardcore poor households thus generating positive socio-economic impacts (Zhang, 2008).

Literature on factors associated with repayment performance of group based microcredit programs is limited, mainly because of the high repayment rate of most of the well known microfinance organizations. Studies commonly focused on how participation in microcredit program improved poor and hardcore poor households socio-economic wellbeing, not whether they encountered any repayment problem and whether there is any difference among the households who encountered repayment problem and those who did not. Among the studies conducted on

repayment performance, they commonly focused on the factors affecting high repayment rate, because most commercial financial organizations categorized poor and hardcore poor as high risk investors and anticipated a very low repayment rate. Arene (1992) in her study in Nigeria measured the effect of clients number level of education, business experience and amount of loan received on repayment performance. Khandaker et al. (1995) in their study in Bangladesh found that training increases repayment performance. Their study also had shown a positive correlation between repayment performance with education infrastructure, density of commercial banks, Grameen Bank manager's salary, electric connection in the area and road width. Matin (1997) in his study on Grameen Bank clients in Bangladesh found that client's level of education and total area of land possessed have a negatively significant effect on repayment problems. Matin (1997) also found that membership period and multiple membership (participation in different microcredit program offered by different MFO's) increases repayment problem whereas loan size did not have a significant effect on repayment performance. Study conducted by Godquin (2004) in Bangladesh denoted that provision of non-financial services have a positive impact on repayment performance and the age of the group members and size of the loan have a negative impact on repayment performance. Hietalahti and Linden (2006) also found that big loan size increases the incidence of repayment problem and also leads to high dropouts. Most recently Deininger and Liu (2009) in their study in India examined whether and how repayment performance is affected by the source of loan, insurance substitute together with loan and group characteristics. Findings of their study showed that loan monitoring, audit, payment frequency and in-kind credit increase repayment performance in India.

The findings of the studies which measured the effect of group dynamics, peer pressure, peer selection, peer monitoring, and other aspects of social capital indicators are also not very straightforward. Zeller (1998) in his study in Madagascar and Wydick (1999) in his study in Guatemala in examining the effect of group dynamics found a positive role of peer selection on repayment performance and they concluded that peer pressure has a significant effect on group's repayment performance. A study conducted by Zeller (1998) also showed that areas with high level of modernization, high density of retailers, program with savings services, size of the group and the ownership of land significantly reduce repayment problem. Wydick (1999) reported that distance between clients businesses and lack of knowledge about each others weekly sales increases the chance of encountering repayment problem. Study conducted by Karlan (2001) also indicated that the lower the distance between group members and the higher the cultural similarities, the lower the percentage of unpaid loan. Ghatak (1999) revealed that group members act cooperatively to increase the repayment rate of group based microcredit programs. However, the findings are not always same. A study conducted by Diagne, Chimombo, Simtowe and Mataya (2000) in Malawi showed that peer monitoring and joint liability had a little or negative effect on repayment performance. Paxton et al (2000) in their study in Burkina Faso showed a positive relationship between repayment problem and group homogeneity, which indicates that social bonding through homogeneity does not improve repayment performance. Their study also reported that rural borrowers encountered higher repayment problem than urban borrowers, commonly due to the high degree of risk associated with agricultural activities. However, Godquin (2004) in Bangladesh reported that group homogeneity has a positive impact on repayment performance. Study conducted by Kasarjyan, Fritzsch, Buchenrieder and Korff (2007) reported that high level of structural and cognitive social capital and high productivity reduce the incidence of repayment problem in Armenia. They also mentioned that the positive effect of joint liability on repayment performance is attributed to the social capital of the group as well as clients knowledge about each others reputation, creditworthiness and intended purpose. Study conducted by Zhang (2008) developed a dynamic model formalizing a 'non-refinancing threat', which formed an integral part of joint liability in group based microcredit model. Zhang (2008) indicated that group lending without the cooperation of group members achieved similar repayment performance as individual lending.

The positive socio-economic impacts of group based microcredit programs and its ability to provide financial services to a large number of poor and hardcore poor households who need the service most to achieve financial sufficiency evidently depends on repayment performance. The borrowers of microcredit who are predominantly the poor and hardcore poor (lower income group), basically do not have any collateral asset, no financial record, no credit history and MFOs lack the means to use the legal system to enforce repayment. In such context, as mentioned by Guttman (2007), economists identified three advantages of group lending that allowed MFO's to accomplish impressive repayment rate. The advantages are:

a.   Clients form groups according to their borrowing tendencies which make it easier for MFOs to identify the safe group from the risky ones. There are two types of borrowers, safe and risky. Borrowers who are likely to succeed in the project funded by the MFOs and/or motivated to repay are safe borrowers. Borrowers who are not safe are risky borrowers. Potential borrowers form their own group is commonly from the same village, know about each other plus have the knowledge about joint liability. Risk averse borrowers tend to form a group among themselves. This

process leads the risky borrowers to make a group among themselves and for MFOs it becomes easier to identify the risky groups and therefore help them to reduce default rate by being more careful about all loan applications.

b.   Since MFOs lack the means to use legal systems to enforce repayment, clients knowing each others information on economic and household activities would thus reduce the moral hazards of risky borrowers intentionally not paying the debts.

c.   The third advantage of group lending is the ability of the group to enforce loan commitments by using social sanctions, such as social isolation and even violent seizing of delinquent borrower's assets (Guttman, 2007).

This third advantage of group lending over individual lending is one of the biggest concerns from welfare perspective. This is the reason why besides measuring the impact it is also important to measure whether respondents encountered any repayment problem even though the repayment rate is very high. A high repayment rate and positive socio-economic impact does not necessarily tell the whole story about how clients repaid the debt. The poor and hardcore poor households who commonly have low investment opportunities, unable to take risk and low marketable skills commonly suffers the most during economic and natural crisis. It is therefore unwise to expect that they have a stable income, and they have the means to repay their in weekly fixed repayment as practiced by group based microcredit programs. Clients encountered repayment problem may eventually drop out from the program or become inactive borrower. Therefore it is important to explore whether clients face any repayment problems or not. This study therefore attempts to identify what are the factors associated with repayment problem encountered by AIM's hardcore poor clients in Peninsular Malaysia.

2. Study Context: Amanah Ikhtiar Malaysia

The poverty rate in Malaysia has declined dramatically after its Independence. While 49.3% of Malaysian households lived below the poverty line in 1970, the poverty rate has reduced significantly to 16.5% in 1990, and further declined to 3.6% in 2007 (Mid-term Review of the 9th Malaysia Plan). The reduction in poverty rate can be attributed to the rapid economic growth in Malaysia which generated higher-paid employment opportunities and profitable micro and small-scale business opportunities in Malaysia (Economic Report, 2008/09). Moreover, the government of Malaysia undertakes several strategies to increase productivity, diversify sources of income and improve the quality of life of the poor. These poverty reduction strategies were the integrated and integral part of Malaysia's core development plans. The government encourages and works together with private sector and non-government organizations (NGO) to reduce poverty. Malaysia's projects under the development program for the hardcore poor provide assistance to two NGO's; namely, Yayasan Basmi Kemiskinan and AIM. Among them, the most active one, AIM provides financial services to about 82% of the total poor and hardcore poor households in Malaysia. AIM uses a group based Grameen Bank model (a Bangladeshi microfinance organization) and provides collateral free credit to poor and hardcore poor households in order to improve their socio-economic conditions.

Commercial banks in most developing countries exclude the poor and hardcore poor by imposing strict rules and regulations. The demand for the products and services offered by commercial banks is low among the poor, not because "*poor do not need financial services*", but the product and service are not designed to meet their requirements. Microcredit was originally established to bridge the capital gap apparently unfilled by the rural cooperatives and commercial banks. It is a collection of banking practices built to provide small loans and accepting small saving deposits. According to Otero (1999), microcredit provides access to productive capital, which enables the poor self-employed to create productive capital, to protect the capital they have, to deal with risk and to avoid the loss of capital. It attempts to build assets and create wealth among poor and hardcore poor people.

AIM started as an applied research project and then institutionalized as a registered private trust in 1987. AIM selects their clients based on clients' gross average monthly household income. Households with gross monthly household income below the poverty line income (PLI) would be considered as absolute poor, while households with gross monthly household income below half of the PLI would be categorized as hardcore poor. PLI has been calculated by the Malaysian government since 1976 and it is estimated based on the price of necessities such as food and other basic needs. AIM only assists households, whose gross monthly household income falls below the PLI which therefore include both poor and hardcore poor households.

In assisting the poor and hardcore poor, AIM practiced a group based model and provides small amount of credit without any collateral. However, no legal action would be taken if the borrowers fail to settle their payments. AIM's microcredit approach is based on small repayment system to be paid on a weekly basis during the center meetings. Although the primary objective of AIM's microcredit schemes is to provide loans for income generating activities (namely I-Mesra loan, I-Srikandi loan and I-Wibawa loan), AIM does provide loans for other activities such as recovery loan (I-Penyayang), education loan (I-Bistari) and housing/multipurpose loan (I-Sejahtera). As of March 2010, AIM has outreached 87 branches in eight states. There are 60497 groups in 6646 centers, currently serving a

total of 254116 clients. AIM provides financial services to 82 percent of the total poor and hardcore poor households in Malaysia with more than 99 percent repayment rate (AIM, 2010).

2.1. Impact of Microcredit

The microcredit program has created considerable trust and expectations among the academics, policy makers, NGO leaders, donors, investors and other development practitioners all over the world. The first comprehensive impact study done by Hossain (1988), found that Grameen members' average household income was 43% higher than non-participants. Grameen bank members spent 8% more on food and 13% more on clothing than non-participants. The investment in fixed assets is about 2.5 times higher for borrowers with more than three years' membership than for those who joined during the year of the survey. His findings show that with loans, Grameen member's generated self employment and the resulting effects on income was impressive.

Khandker and Chowdhury (1995) noted that the increase in self-employment among the poor with access to credit has resulted in an increase in rural wages. Mustafa et al. (1996), mentioned that BRAC (Bangladesh Rural Advancement Committee, Microfinance Organization, Bangladesh) clients household expenditure increased from an average of BDT419 (BDT - Bangladeshi Currency) per week (members for 1-11 months) to BDT528 (members for 48 or more months), an increase of 28%. The household assets increased from an average of BDT10959 to BDT23230. Kamal (1999) in his study on ASA's (Association for Social Advancement, Microfinance Organization, Bangladesh) clients, noted that among the respondents, 90.42% of members reported that their business capital has increased; 88.41% of the respondents had better access to medical services, 38.93% respondents reported that their household assets have increased; 59.66% reported an increase in value of livestock and 30.32% reported that their ownership of ornaments had increased after participating in microcredit programs.

Khandker and Pitt (1998), in his study on BRAC clients, mentioned that for every BDT100 (BDT – Bangladeshi Currency) lent to a woman, household consumption on the average increased by BDT18; interestingly the figure is BDT11 if the same amount was lent to a man. Moderate poverty falls by about 15% and ultra poverty by 25% for households who have been BRAC members for up to three years. Latifee (2003) in his study on Grameen Bank's clients in Bangladesh noted that about 90% of borrowers reported an improvement in standard of living. He also noted that poverty rate among borrowers declined significantly. Dunn (2005) conducted an impact study in Bosnia and Herzegovina, and indicated that microcredit had a significant positive impact on household income, employment, business investment, business registration and post-war transition. Hussain and Nargis (2008) mentioned that household income increased across all income percentiles for all regular, occasional and non-participant groups. The average annual household income grew at an annual compound rate of 3.88% to rise from BDT48195 in 1998 to BDT60546 in 2004. The study conducted by Rahman, Rafiq and Momen (2009) mentioned that age, education and number of gainfully employed members has a significant positive effect on household income and asset. This study suggested some adjustment to the existing microcredit programs to achieve the intended outcome, that is, to serve the purpose of those in the lower income society. Panda (2009) in his study conducted in India noted a significant increase in borrowers household income (11.41%), asset position was 9.75% higher than non participants and the savings increased by 42.53%. This study also found an increase in annual employment days among the clients.

The impact of AIM's microcredit schemes follow a similar pattern, as found in Grameen's microcredit model. The first internal impact study conducted by Gibbons and Kasim (1990) discovered a significant increase of client's monthly household income. The Second Internal Impact Study (1990), showed further overall improvement among participating households. In mid-1990, the Malaysian government initiated an impact assessment study on AIM's microcredit schemes by a team of Social Science and Economic Research Unit (SERU) of the Prime Ministers Department. Findings from SERU (1990) impact study reconfirmed the findings of first two impact studies. This study noted that overall household income has more than doubled (from RM197.78 per month to RM465.66 per month) after participating in AIM's microcredit schemes. SERU (1990) also measured the impact on quality of life, by analyzing the ownership and quality of housing, type and quality of household assets, agricultural land and savings. Increase in household income enabled the participants to improve their housing conditions. As for cost effectiveness, with an operating cost of RM7056, AIM managed to release 249 poor families from poverty. The Third Internal Impact Study (1994) showed that among non-participating poor, 77 percent were still under poverty line. Among them, 32.7 percent were at the bottom half; and only 23 percent managed to escape out of poverty without microcredit. Salma (2004) noted that household income, expenditure, savings and assets of AIM participants increased compared to non-participants.

3. Research Model

The conceptual model of impact chain present a complex set of links as each 'effect' becomes a 'cause' in its own right generating further effects. One of the most complex conceptual models for impact assessment was presented

by Chen and Dunn (1996), called household economic portfolio model (HHEP). The main advantages of HHEP model is that, it helps in the formation of research design and hypothesis. The researchers from 'Project AIM' confirmed the usefulness of HHEP model in addressing the fungibility and attribution issues. The implications of HHEP models were used to design and test a structural equation model to determine how common household variables caused repayment problems. The independent variables are household income, fungibility issue, number of gainfully employed members, number of sources of income, household heads number of years in school and total savings.

Insert Figure 1 Here

Total amount of household income represents household's overall economic wellbeing, therefore expected to have a negative linear relationship with repayment problem and expected to correlate with other independent variables. The fungebility issue represents the uses of loan client's received from AIM's microcredit schemes in non-income generating activities. It was expected that respondents who used credit in income generating activities have a lower chance to encounter repayment problem, therefore expected to have a significant negative linear relationship with repayment problem. Fungibility issue is also expected to correlate with household income and total savings.

The number of gainfully employed members represents the productive base of the households and it is expected that households with a higher number of gainfully employed members will encounter less repayment problem. The number of gainfully employed members will significantly correlate with household income, number of sources of income, household heads number of years in school and total savings. Number of sources of income increase household's ability to repay even when the main economic activities are interrupted. Therefore, number of sources of income are expected to have a negative linear relationship with repayment problem, and also expected to correlate with other independent variables except fungibility issue.

Household heads' number of years in school represents household money management skill, ability to use credit, ability to grasp the economic opportunities and therefore is expected to have a significant negative linear relationship with repayment problem. Total amount of savings represents household's ability to repay, and therefore expected to have a negative linear relationship with repayment problem. Total amount of savings is also expected to correlate with household income, number of gainfully employed members and number of sources of income.

4. Research Design

This research employs a cross-sectional design where the sampling scheme used is stratified random sampling. Samples were selected from three different geographic areas from three states namely Kedah, Kelantan and Terengganu in Peninsular Malaysia. These three states were randomly selected from the bottom six states (poverty rate were relatively higher in these six states) of Peninsular Malaysia based on level of poverty. AIM offered financial services to the poor and hardcore poor households through a total of 28 branches in the three selected states. Most of these branches are located in very small towns or rural areas, as the poverty rate in isolated rural areas are much higher than urban areas. Among these 28 branches, three branches were randomly selected. The selected three branches were Baling in the state of Kedah, Pasir Puteh in the state of Kelantan and Setiu in the state of Terengganu. Data were collected from these three branches.

The sampling methodology was designed to collect data from two groups of clients, where both groups were selected from AIM's client base. Therefore this study selected new clients (number of months as clients was less than 24 months) and old clients (number of months as clients were between 48 months to 72 months) based on the number of month they participated with AIM. All the clients were first selected based on number of months they have stayed as clients and then selected again based on pre-AIM household income. Clients with pre-AIM household income below half of the joining years PLI were the hardcore poor clients. 2779 clients participated in this program in all three branches for the study period. Among them, a total of 505 clients or 18% of the 2779 clients were hardcore poor and among these 505 clients, 22 clients or 4.36% clients dropped out from the program. Data were collected from AIM's client's record book. Data on 483 hardcore poor new and old clients' included current unpaid debt, pre-AIM household income, joining date, total amount clients saved in AIM, total amount of credit received from each scheme and the total amount of credit received.

In the second stage of data collection, the researcher explained the purpose of this study to the clients and requested their permission to interview them. Among the 483 clients, 386 clients agreed to be interviewed after their weekly center meeting, of whom 184 were old clients and 202 were new clients. Among the 386 clients, 45 clients mentioned that they received credit from other sources after they joined AIM's microcredit program, and 8 clients did not answer all the questions because of personal reasons. Clients who received credit from other sources and those who did not answer all the questions were excluded from the study and complete data were collected from the remaining 333 hardcore poor clients, among them 161 were old clients and 172 were new clients.

5. Summery of Findings

The findings of repayment performance model are summarized in three parts. The first part tested the assumption of multivariate normality. The second part of the findings discusses the model fit summaries, which include Model Chi-Square (CMIN), Relative Chi-Square (CMIN/DF), Root Mean Square Error of Approximation (RMSEA), Goodness-of-Fit Index (GFI), Normed Fit Index (NFI), Comparative Fit Index (CFI), Adjusted Goodness-of-Fit Index (AGFI), Tucker-Lewis Index (TLI), Incremental Fit Index (IFI, also known as Bollen's IFI) and Relative Fit Index (RFI). The third part of the findings presents the structural coefficients, correlations, the un-standardized coefficient estimates and the corresponding p-values.

The multivariate kurtosis value or Mardia's coefficient for repayment performance model is 34.533, which is higher than 1.96, therefore multivariate normality cannot be assumed. The *p*-value of Bollen-Stine bootstrap test is 0.005, which is also less than 0.05. To fulfill the multivariate normality assumption, the data used in repayment performance model therefore transformed to logarithmic form. The multivariate kurtosis value after logarithmic transformation is 0.794, which is lower than 1.96, therefore multivariate normality assumption is satisfied. The *p*-value of Bollen-Stine bootstrap test is 0.239, which is more than 0.05, which indicates that a satisfactory model fits multivariate non-normality.

The model fit measures were obtained using AMOS version 18 and presented in Table 1. The model chi-square value is 6.150 with 4 degree of freedom. The p-value of model chi-square is 0.188, indicating that the overall model fit is acceptable. The relative chi-square value is 1.538, which is smaller than 2, also indicates a good model fit. The comparative fit index or CFI should be equal to or greater than 0.90 for the model to be accepted, which means that 90% of the covariation in the data can be reproduced by the given model. The CFI for the research model is 0.995, providing a satisfactory model fit. By convention, the incremental fit index or IFI should be greater than or equal to 0.90 for the model to be accepted. The IFI for the model is 0.995, indicting a satisfactory model fit. By convention, the Normed Fit Index or NFI values above .95 serves as a good model fit. NFI for the model is 0.968, which indicates a satisfactory model fit. The relative fit index or RFI close to 1 shows a good model fit. RFI for the model is 0.928, signifies a satisfactory model fit. The TLI also called non-normed fit index close to 1 indicates a good fit. The TLI for the research model is 0.974, which is very close to 1, indicates an acceptable model fit. The root mean square error of approximation or RMSEA for the research model is 0.040, which is less than 0.05, provides a satisfactory model fit. Moreover, Hoelter's critical N for the research model at 0.05 level of significance is 513, which is greater than 200, indicating that the sample size used to test the model is adequate. The model fit summaries - CMIN, CMIN/DF, RMSEA, NFI, RFI, IFI, TLI and CFI, all indicate that the model serves as a good fit. In addition Hoelter's critical N indicates that the sample size used is adequate to test this model. However the overall fit test does not establish that the particular paths in the model are significant. Since the research model is accepted by all the above mentioned model fit indexes, the research proceeded to analyze the correlation matrix and structural coefficient.

The correlation coefficients of all variables are presented in Table 2. As expected the average monthly household income has a significant positive moderate to low correlation with total savings, household heads number of years in school, number of gainfully employed members and number of sources of income. The total savings is significantly correlated with number of gainfully employed members and number of sources of income. Fungibility is significantly correlated with household heads number of years in school, but the direction of relationship is opposite of what is expected.

Standardized structural coefficient estimates are based on standardized data and the standardized weights are used to compare the relative importance of the independent variables. When the *p*-value is less than 0.05, the path is significant at 5% level. The standardized regression coefficient, unstandardized regression coefficients and corresponding *p*-values are presented in Table 3. Among the independent variables, the standardized regression coefficients indicates that the higher the household income the lower the chances of encountering repayment problem. A negative coefficient between fungibility issue and repayment problem indicates that respondents who used credit on income generating activities are less likely to encounter repayment problem. The number of gainfully employed members also has a negative regression coefficient with repayment problem, indicating household with higher number of gainfully employed members are less likely to encounter repayment problem. A negative regression coefficient between number of sources of income and repayment problem indicates that households with multiple sources of income are also less likely to encounter repayment problem. Household heads numbers of years in school also decreases the chance to encounter repayment problem. As presented in Table 3, among the regression weights for the five independent variables, two of the coefficients are significant at 5% level. The unstandardized regression weight of household income on repayment problem is − 1.046 with a *p*-value of 0.011, indicates that as expected, clients with high income encountered less repayment problem. However the significant positive linear

relationship between total saving on repayment problem is unexpected. Respondents with higher savings are expected to encounter less repayment problem, but data provides no evidence that total savings decreases repayment problem encountered by hardcore poor clients of Amanah Ikhtiar Malaysia.

6. Conclusions and Recommendations

As mentioned before, the poverty rate in Malaysia declined significantly from 16.5% in 1990 to only 3.6% in 2007. This is also the period when AIM was providing financial services to both poor and hardcore poor households in Malaysia. AIM currently outreached 82% of the total poor and hardcore poor households, with their wide range of collateral free microcredit schemes. AIM is funded by Ministry of Finance, Malaysia, and both the Malaysian government and AIM's objective was to reduce poverty rate in Malaysia. Development academicians and government officials are always trying to find out whether AIM's financial services to the poor and hardcore poor assists them to increase their household income and reduce the poverty rate in Malaysia. Earlier studies showed that AIM's microcredit program significantly increased average monthly household income. This study however focused on measuring the repayment performance among the hardcore poor clients in peninsular Malaysia.

The findings of this study show that microcredit services offered by AIM are not free from fungibility issues and repayment problem. More than 50% of the total respondents reported that they used credit in non-income generating activities, which increases the chance of encountering repayment problem. Repayment problems can lead clients to drop out of the program or become inactive borrowers. When hardcore poor households' income flows are interrupted, which is frequently the case; the clients may have to sell their fixed assets to repay the loan. AIM therefore has to consider a flexible loan policy to allow poor and hardcore poor households to reschedule the loan when clients encounter any financial crisis. A flexible microcredit program with a flexible repayment services is already being practiced by many MFO's all over the world. Microfinance organizations in Bangladesh offer various types of specialized, more flexible microcredit services. Designing a flexible microcredit program with flexible repayment system can attract more potential clients, reduce dropouts, enable existing clients to receive more credit and retain clients for a longer period of time. Moreover, flexible microcredit services will enable clients to receive higher amount of loan and therefore increase the household's income and reduce repayment problem. AIM should also focus on appropriate training and development programs in order to enable the hardcore poor households' to use credit in income generating activities, grasp employment generating opportunities as well as find and invest in new income generating activities, which ultimately reduce their repayment problem.

References

AIM. (2010). *About Amanah Ikhtiar Malaysia*. [Online] Available: http://www.aim.gov.my [2010, December, 09].

Arene, C.J. (1992). Loan repayment and technical assistance among smallholder maize farmers in Nigeria, *African Review of Money and Banking. A Supplement of Savings and Development Journal*, Vol. 1, pp. 64-72.

Chen, M. A. and E. Dunn. (1996). *Household Economic Portfolios*, AIMS Project, Washington, D.C.: Management Systems International.

Deininger, K. and Liu, Y. (2009). *Determinants of Repayment Performance in Indian Micro-Credit Groups*, Policy Research Working Paper – 4885, The World Bank.

Diagne, A., Chimombo, W., Simtowe, F., & Mataya, C. (2000). Design and sustainability issues of rural credit and saving programs for the poor in Malawi: An action oriented research project. Washington, DC: IFPRI.

Dunn, E. (2005). *Impact of Microcredit on Clients in Bosnia and Herzegovina*, Foundation for Sustainable Development of the Federation of Bosnia and Herzegovina and Republika Srpska Development and Employment Foundation.

Economic Report. (2008/09). *Economic Report*, Ministry of Finance, Malaysia, [Online] Available: www.treasury.gov.my [2010, January 17].

Ghatak, M. (1999). Group lending, local information and peer selection, *Journal of Development Economics*, Vol. 60, Pp. 27–50.

Gibbond, D.S. and S. Kasem. (1990). *Banking on the Rural Poor,* Center for Policy Research, University Sains Malaysia.

Godquin, M. (2004). Microfinance Repayment Performance in Bangladesh: How to Improve the Allocation of Loans by MFIs, *World Development*, Vol. 32 (11). Pp. 1909-1926

Guttman M.J. (2007). *Repayment Performance in Microcredit Programs: Theory and Evidence*, Working Paper-11, Networks Financial Institute, Indiana State University.

Hietalahti, J. and Linden, M. (2006). Socio-economic Impacts of Microfinance and Repayment Performance: A Case Study of Small Enterprise Foundation, South Africa. *Progress in Development Studies*, Vol. 6, No. 3, pp. 201-210.

Hossain, M. (1988). *Credit for the Alleviation of Rural Poverty: The Grameen Bank in Bangladesh,* Research Report No. 55, IFPRI, 1988, Washington, D.C.

Hussain, G. and Nargis, N. (2008). *A Welfare Economic Analysis of the Impact of Microfinance in Bangladesh,* Department of Economics, University of Dhaka, Nilkhet, Dhaka-1000, Bangladesh

Kamal, M. M. (1999). *Measuring Transformation: Assessing and Improving the Impact of Microcredit*, Impact Evaluation Mechanism of the Association for Social Advancement (ASA). Part 3, [Online] Available: http://www.microcreditsummit.org/papers/impactpaper3H.htm [2008, October 9]

Kasarjyan, M. C., Fritzsch, J., Buchenrieder, G. and Korff, R. (2007). *Repayment performance under joint liability borrowing, does social capital matter? : Evidence from Armenia*, 104th (joint) EAAE-IAAE Seminar Agricultural Economics and Transition, Corvinus University of Budapest (CUB). Budapest, Hungary. September 6-8, 2007

Karlan, D. (2001). Microfinance Impact Assessments: The Perils of Using New Members as a Control Group, *Journal of Microfinance*, Vol. 3(2). pp. 75-86.

Khandker, S.R., Khalily, B., & Khan, K. (1995). *Grameen Bank: performance and sustainability*, World Bank Discussion Paper - 306, The World Bank, Washington, DC.

Khandker, S.R. and O.H. Chowdhury (1995). *Targeted Credit Programs and Rural Poverty in Bangladesh*, Washington, W.C.: World Bank.

Khandker, S. R. and Pitt, M. (1998). The Impact of Group-Based Credit Programs on Poor Households in Bangladesh: Does the Gender of Participants Matter? *Journal of Political Economy*. Vol. 106, pp: 958-96.

Latifee, H. I. (2003). *Microcredit and Poverty Reduction*, International Conference on Poverty Reduction through Microcredit. Taksim-Istambul, June 09-10, 2003.

Matin, J. (1997). Repayment Performance of Grameen Bank Borrowers: The Unzipped State, *Savings and Development*, Vol.4, 1997, pp.451- 473.

Mid-term Review of the 9th Malaysia Plan (2008) Economic Planning Unit, The Government of Malaysia, [Online] Available: http://www.epu.gov.my [2008, December 12]

Mustafa, S., Ara, I., Banu, D., Hossain, A., Kabir, A., Mohsin, M., Yusuf, A., and Jahan, S. (1996) *Beacon of Hope: An Impact Assessment of BRAC's Rural Development Programme*. Research and Evaluation Department, Bangladesh Rural Development Committee, Dhaka, Bangladesh.

Otero, M. (1999). Bringing Development back into Microfinance*, Journal of Microfinance*, Vol-1, Issue-1

Panda K. D. (2009). Participation in the Group Based Microfinance and its Impact on Rural Households: A Quasiexperimental Evidence from an Indian State, *Global Journal of Finance and Management*, Vol: 1, No: 2, Pp: 171-183.

Paxton, J., Graham, D. and Thraen, C. (2000). Modeling group loan repayment behaviour: new insights from Burkina Faso, *Economic Development & Cultural Change*, vol. 48(3). pp. 639–55.

Rahman, S., Rafiq, R. B. and Momen, M. A. (2009). Impact of Microcredit Programs on Higher Income Borrowers: Evidence From Bangladesh. *International Business & Economics Research Journal,* Vol-:8, Issue: 2

Salma M. (2004). *A Comparative Case Study on Outreach and Impact of Ikhtiar Loan Scheme and Special Program for Hardcore Poor in Seberang Perai Pulau Pinang.* M.Phil Thesis, University Science Malaysia.

Second Internal Impact Study. (1990). *Impact Assessment Report*, Research and Development Unit, Amanah Ikhtiar Malaysia.

SERU (1990). *Impact Assessment Report*, Research and Development Unit, Amanah Ikhtiar Malaysia.

Third Internal Impact Study (1994). *Third Impact Stud*y, Research and Development Unit, Amanah Ikhtiar Malaysia

Wydick, B. (1999). Can social cohesion be harnessed to repair market failures? Evidence from group lending in Guatemala, *The Economic Journal*, Vol. 109, Pp. 463–475.

Zeller, M. (1998). Determinant of repayment performance in credit groups: The role of program design, intragroup risk pooling, and social cohesion, *Economic Development and Cultural Change*, Vol. 46(3). Pp. 599–621.

Zhang, W. (2008). Ex-ante Moral Hazard and Repayment Performance under Group Lending, *Journal of East Asian Studies*, No. 06 (3). Pp. 145-171

Table 1. Model Fit Summery

CMIN	DF	P-Value	CIMN/DF
6.150	4	0.188	1.538
NFI	RFI	IFI	TLI
0.968	0.928	0.995	0.974
CFI	RMSEA	Hoelter's critical N	
0.995	0.040	513	

Table 2. Correlation of all Independent Variables (After Transformation)

Variables		Expected Sign	Pearson's Correlation	
			Estimate	P-Value
Household Income ↔ Total Savings		+	0.589	0.000
Household Income ↔ Fungibility		-	0.050	0.367
Household Income ↔ HHH YIS		+	0.233	0.000
Household Income ↔ GEM		+	0.619	0.000
Household Income ↔ SOI		+	0.255	0.000
Total Savings ↔ Fungibility		-	-0.043	0.430
Total Savings ↔ HHH YIS		+	0.087	0.115
Total Savings ↔ GEM		+	0.400	0.000
Total Savings ↔ SOI		+	0.175	0.001
Fungibility ↔ HHH YIS		-	0.180	0.001
Fungibility ↔ GOM		-	-0.052	0.347
Fungibility ↔ SOI		-	-0.092	0.094
HHH YIS ↔ GEM		+	0.098	0.073
HHH YIS ↔ SOI		+	0.039	0.474

HHH YIS: Household Heads Number of Years in School; GEM: Number of Gainfully Employed Members; SOI: Sources of Income.

Table 3. Regression Coefficients

Variables	Standardized Regression Weight	Unstandardized Regression Weight	P-Value
Repayment Problem ← Household Income*	-0.198	-1.604	0.011
Repayment Problem ← Fungibility	-0.080	-0.074	0.134
Repayment Problem ← Number of Gainfully Employed Members	-0.062	-0.734	0.393
Repayment Problem ← Number of Sources of Income	-0.092	-1.219	0.120
Repayment Problem ← Household Heads Number of Years in School	-0.058	-0.048	0.290
Repayment Problem ← Total Savings*	.272	1.182	0.000

Note: * Significant at 5% level
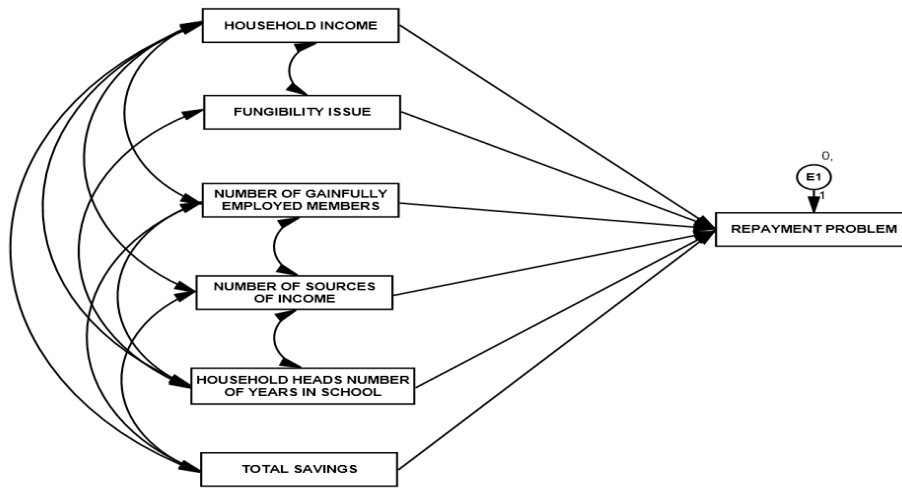
Figure 1. Repayment Performance Model

Variables Affecting the Payment Mechanism for Strategic Purchasing in the Indirect Health Section of Iranian Social Security Organization

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Abstract

The present study was conducted to define the variables affecting payment mechanism for strategic purchasing in the indirect health section of Iranian Social Security Organization of Iran, by which the Organization can provide the insured with better services while controlling the cost. 13 variables affecting payment mechanism for strategic purchasing were determined. A questionnaire was prepared based on above variables and completed by experts. The data was analyzed by SPSS and LISREL through confirmatory and exploratory analysis factors. The results indicate that payments mechanism is important in the process of strategic purchasing and three partial dimensions including performance-based payment mechanism, time-based payment system and risk coverage should be considered: 1-Performance-based payment system includes variables such as financial incentives for health service providers, prospective payment system and performance-based motives for health service employees. 2-Time-based payment system includes variables such as the time of receiving service. 3. Risk coverage includes variables such as justice and financial protection against disease risk.

1. Introduction

Studies in the health field show that almost half of the health resources are allotted to 4% of population who are hospitalized annually (Hasanzade & Fakhimzade, 2007). Iranian Social Security Organization has allocated the significant portion of Iranian health market. It consider as the second main producer and the greatest purchaser of health services throughout the country. 45% of resources are consumed for delivering services in direct health section and the 55% remainder is spent for indirect health section. 37% of total credit in indirect health section is spent for in-patient services and more that 70% of resources are allocated to these patients.

According to the above statistics, more that 55% of health costs of the Organization are spent for delivering services to the insured through purchasing health services in indirect health section, which in return necessitates the existence of consolidated management in purchasing services (Statistical Indicators of Health Department, 2008).

At present, purchasing services in the Social Security Organization is carried out with regard to the definite annual budget and medical bills, but the growing costs of health services and the necessity of delivering necessary and qualified health services manifest the role of strategic purchasing process more than ever.

The increase in the costs of health services in the Social Security Organization in recent years, following the increase of the number of insured and the transference of advanced technologies from other countries, have become a challenge for the Social Security Organization, while taking into account the Organization's responsibility in providing insured, retirees and pensioners with health services; as a result, the optimum usage and compiling a logical mechanism based on the scientific standards in purchasing health services seem undeniable. The

management of scarce resources in an effective way is one of the most important interfering mechanisms in health section.

The experiences indicate that without adopting a strategic policy and with a focus on payment mechanisms, poor and common individuals are probably ignored. Strategic purchasing is used as a tool in promoting the performance of health section and other economic sections. The experiences arisen from utilizing this tool has become successfully operational in developed countries (Preker & Harding, 2003).

1.1 The significance of the Subject

Based on the international experiences, the advancement of sciences and development of new methods in surgical sciences, inventing numerous medicines and implementing other related operations, even in low income countries have had favorable results, but most of the implemented programs within the health filed, before applying to the poor people, have failed (Preker *et al*., 2007).

The market of health services has always faced numerous problems arising from the inefficient allocation of resources. One of the most significant reasons of this inefficiency is the asymmetry of information between consumers and users of health services (including patients, etc.) and health service providers (clinical centers, hospitals, doctors, etc). The asymmetry of existing information implies the inability of the users in discerning what kind of health care they need and what kind of health service is suitable for them (O'Neil & Largey, 1998). Patients in a perfect market express their requests in payment through response to the demand. Providers of the services and producers of these conditions compete with each other in a perfect market model based on the principles of marketing, in a way that the expenses of these delivered services is in proportion to the volume and the amount of supply and demand (Langenbrunner *et al*., 2005).

1.2 Objectives

With regard to the importance of the payment mechanism for strategic purchasing in the indirect health section of Social Security Organization, the present study aims at defining the variables affecting payment mechanism for strategic purchasing in order to promote the performance of insurance organizations in providing health services and just distribution of the services among insured, so the Organization becomes able in providing insured with more qualitative services while controlling the costs.

1.3 Theoretical Principles

In examining the health and treatment status and related costs in the United States, it is believed that in managed care, insurance purchasers and insurers do not just draw check; they become involved in what number, from what type, and by which providers they receive care (Aaron, 1991). Moreover, purchasers and insurers decide how much service providers receive and how it is paid. Four main methods of payment for health care are: out of pocket, individual private insurance, employment-based group private insurance, government financing. These four methods can be considered as a historical evolution as well as finance classification for the current status of health care. Health care financing in the United States, following a series of social interventions, became more perfect until it got the modern form. From the historical point of view, each of the four methods of financing health care was created in a response to compensate for the insufficiency of the previous method.

Countries, through studying and evaluating various methods of payment, achieved a high level of knowledge in methods and the time of payment to the health care providers. Designing, management and implementation, as well as related reforms, have been considered in the process of strategic purchasing for transition from the current state of health systems. Three efficient and effective methods have been implied in the payment system of health service providers; these methods are: capitation payment system for basic health care, per-case payment system for hospital services, and hospital global budget.

1.4 Payment Method

Appropriate contract components to purchase services are: spot market for unpredictable cases, contracts to provide semi-support services for predictable cases, franchise method (agency) to standardize the needs in different places, communication contracts for purchasing, which are difficult to monitor (Preker & Harding, 2003).

From the above discussions it is perceived that most of the goods and services in a perfect market show a degree of reduction in competitiveness and measurement. Governments possess the tools that can help solve these problems. Some of these tools are: providing necessary information, enactment of laws and regulations, contract to receive services, creating subsidies or direct financial relationship and beginning the production of public sector.

The results of the studies definitely show that payment system of service providers is defined by affecting the characteristics of goods through three key factors of internal incentives in organizations providing health care

including: 1) distribution of the right of decision making about the created profit 2) contact with the market 3) Readiness to solve social functions.

Services delivered by providers give different responses to the payment mechanisms and substitute financing. For instance, group buying by health social insurance investment in Germany offers various messages to the service providers which are more than regular and organized competition in the United States, guided demand of consumers through out-of-pocket system in India, stored bills for medical services in Singapore and exclusive purchasing in England.

Following cases should be observed in order to prevent financial risks in the payment systems of health care service providers: risk coverage approach must be changed; it means it should change from low range to high range of risk coverage, poor people be supported. So, strategic purchasing leads to the improvement of results and accountability in health system (WHO Report, 2000).

1.5 Payment Methods and Payment Incentives

There are three ways of payment to a service provider: 1- patient's direct payment to the service provider 2- patient's direct payment to the provider and then paying back the whole or a part of the cost 3- direct payment to the provider through "allocation of resources and purchasing services" mechanism along with a limited franchise or patient's informal cost (WHO Report, 2000).

1.6 Appropriate Payment Method

At first step, the buyer decides about the policy objectives such as: resources, efficiency, costs' reduction and access to quality and simplicity of implementation or a combination of these. The payment system should be in line with the achievement of one or several objectives mentioned above. The buyer considers the payment mechanism in two axes: payment unit and payment level.

Payment unit can be fully clear such as: number of visits or tests. Payment unit may be cumulative such as: a period of care or the needed services within a span of time like a year.

Payment level is based on standard and expected cost of services, number of providers, competition between providers, volume of health product, appropriate information at hand, and patient's ability to participate in costs. (Barnum *et al*., 1995) (Table1).

Table 2 shows the common payment mechanisms. Creating motives and incentives factors to achieve other objectives in payment system are necessary when line item budget method is effective in controlling the costs. The above objectives are: preventing the problems of health filed for members and beneficiary groups in this field, delivering services and solving the members' problems, responding to the patients' legal expectations and reducing costs.

Capitation payment is a kind of fixed payment system which defines the responsibility of health care providers within a vast range of delivered services. This method is an incentive factor to control costs and prevent unnecessary expenditures. Due to the advantages of capitation system in controlling costs, capitation method is used in some organizations purchasing services in the world. This method has become operational in England National Medicine (Robinson & Grand, 1994), and the network of service providers in Social Security Organization of Argentina (World Bank Report, 1998), non-affiliated organizations in New Zealand (Wilton & Smith, 1998) and the organizations of health care providers in the United States (Feachem, 2000).

1.7 Purchasing and Methods of Payment to Health Care Providers

Patients in a perfect market bring up their needs in payment through responding to demand. Providers of these services and producers of such conditions compete with each other based on marketing principles; in a way that the costs related to the delivered services is proportionate to the volume and the level of supply and demand. The advantage of patients' direct payment of health costs and services is that it conveys a clear message to the patients about the fee of the service. Therefore, the individual providing these services is fully aware of the existing requests. The major problem is the destitute patients or the high care costs in cases of special diseases; these costs are not finished all at once; they are spent in a definite time span in order to receive partial or full compensation during a treatment process and are received by the hospital (Langenbrunner *et al*., 2005).

According to the studies taken, buyers should shift their direction from fee-for-service payment mechanisms to those mechanisms covering risks. In order to create and establish mechanism payment systems, particularly in public sectors, special techniques, particular organizational capacities and accountability are needed (WHO Report, 2000).

A research was taken by Buss in 2004 which examined the strategic purchasing process about which services, how, how much and from whom are bought. Payment system issues, allocation of resources, contracts, and result-based

and performance-based systems were taken into consideration in the survey. The question "who pays the cost for health system?" and selecting payment system for health care costs have been mentioned in the World Health Report 2000. The discussion has emphasized on subsidy payment to patients and poor individuals with low income. Moreover, it pays attention to strategic purchasing in health services to promote results, health system performance and accountability. In another section, different payment mechanisms including line item budget, global budget, capitation and fee-for-service have been taken into account (WHO Report, 2000).

Payment based on the efficiency of activities (result-based payment) instead of payment based on the costs is the result of a research carried out in 2008 in Portugal by Borges and Kondoso. New competition market is a kind of payment system of hospital services introduced in September 2004 by groups of health care producers in England (Boyle, 2007). About 10% of the population, due to out-of-pocket costs, has gone below the poverty line and more than 20% of the income of 7% of the population, particularly in countries with low per-capita income, is spent for medical expenditures. According to the above report, the impact of out-of-pocket payment system should be evaluated. A framework of contract and methods of payment have been introduced in Estonia in relation to various incentive factors compatible with kinds of health care providers (Habicht *et al.*, 2005). Methods of payment for service providers are being developed increasingly in this country. These changes generally have legal origins and are coordinated. Similar to most developed countries, most efforts are done to find the best solution for paying more to best results. For example, the method of payment to general physicians including capitation method which is based on age right now and fee-for-service method as an incentive factor to perform extra care at the level of primary care are used.

Payment method in hospital care is defined by in-patient days in the hospital. At present, the system is based on diagnostic related groups which is a balancing and incentive factor (Grignon *et al.*, 2004). The major problem of payment to health providers in Estonia is that the individuals are not satisfied. Justice in accessing services and resources of health section should be observed. Examining methods of payment in Australia shows that fee-for-service is a common method for paying general physicians and advanced private care. Therefore, patients agree to change the financing system for primary care services in order to enjoy greater access to cares. This payment method is called capitation designed for people with great needs in primary care (Kutzin & Couffinhal, 2005).

Based on the existing laws and regulations, regional purchasing-service institutions in New Zealand are obliged to contract for all services. By separating the role of the buyers and health service providers and introducing the market for delivering services, it is expected to establish motives and financial incentives for greater efficiency and conformity of neoclassic economic theory with competitive market. It is also predicted that purchasing services through contract helps proper increase in delivering qualitative and quantitative services and ensure that the actual and suitable price is paid (WHO Report, 1993).

2. Research Methods

The present research is a kind of applied study conducted through descriptive-comparative method. With regard to the experiences of selected countries and studying the related theories and models, the variables affecting payment system for strategic purchasing in the indirect health section of Iranian Social Security Organization were identified. For this purpose, the most important variables which are necessary in a payment mechanism system were identified and a questionnaire was prepared based on the above variables and completed by the experts. The experts included 80 executive experts from the indirect health section of Iranian Social Security Organization and General Office of Medical Services.

The research was conducted in 5 stages:
Stage1: studying theoretical principles, examining related studies in the country and abroad,
Stage2: studying the experiences of other countries and the history of the issue in the Iranian Social Security Organization,
Stage3: defining effective variables on health care payment mechanism,
Stage4: preparing a questionnaire based on the identified variables and collecting the experts' views,
Stage5: verifying variables affecting health care payment mechanism through confirmatory and exploratory analysis factor by LISREl and SPSS softwares.

The validity of the questionnaire was determined through content validation method by 5 experts in strategic purchasing of health services and they were asked to express their opinions about the content and the style of the writing in a written form. The Ratio Content Validity was 0.98 which represented the content validity of the questionnaire. In fact, the exploratory analysis factor and its impact on determining the effective variables of payment mechanism for strategic purchasing implies that the questionnaire enjoys construct validity. The process of

preparing and screening data started with the discussion about the multivariable normality, linearity, homogeneity of variance and multicollinearity. The common criterion to evaluate the normality is examining the statistical skewness and kurtosis. Kline (2005) believes that if skewness and kurtosis are between +2 and -2, the data is normally distributed on the 0.05 level. The data of the present study shows that the statistical values of skewness and kurtosis are between +2 and -1.447. So, the data has been distributed properly matrix scatter were used to determine the linearity of the relation among variables and the results showed that no relation among pointers indicated the obvious deviation from linearity. Leven Test was used to examine the variance in the research. P>0.05 and F=2.197 show that this hypothesis exists among the data of the study. Linearity happens when the internal correlation among variables is above 0.80. This phenomenon makes any mathematical operation difficult. In order to determine the reliability of the questionnaire, it was given to the 10 members of the scientific board of the university who had a research background on the same subject; they answered the questions 2 times within two weeks and Alpha Chronboch coefficients were calculated (0.71) to evaluate the internal coordination of the variables and correlation coefficient was determined 0.88 after re-testing.

3. Findings

According to table3, the average of the payment mechanism variables ranges from 3.35 to 4.32. The average of the variables 8, 4 and 12 were less than 3. It can be said that there is an appropriate internal coordination among variables of payment mechanism.

Kaiser Maier Olkin index was 0.602 and significant level of Kroyt Bartlet index was less than 0.001. Therefore, correlation matrix analysis in the selected group can be justified. Special value indicators, variance percentage and rotated chart of scree special values were examined to determine how many factors saturate payment mechanism variables. Based on these indicators, 3 factors were extracted from the total variables of payment mechanism which explain 51.03% of total variance. The first, second and third factors justify 22.54%, 17.1% and 11/43% of total variance of all the variables in payment mechanisms respectively. Table 4 shows load factor of payment mechanism variables on factors 1, 2, and 3 after Varimax rotation. Minimum accepted load factor was considered 0.4. The structure matrix is shown in table 4. The extracted model was obtained after 5 rotations.

Three factors were extracted based on the structure matrix of variables. The minimum load factor (0.379) belongs to variable 2 and the maximum load factor belongs to variable 6. These factors were named according to the compound of each one of 1, 2, and 3 factors in table 4: the first partial factor: performance-based payment system, the second partial factor: time-based payment system and the third partial factor: risk coverage.

The mathematical model extracted from the variables of payment mechanism in the process of strategic purchasing is a model with 3 partial dimensions including: performance-based payment system with 5 variables, time-based payment system with 4 variables, and risk coverage with 3 variables. Structural Equation Modeling (SEM) was used at this stage to verify the extracted model and determine the relationship among them. Figure 1 shows the related model.

Fitness indicators and x^2/df for measuring model were considered 1.21 in the study, Comparative FI and GFI more than 0.9 and AGFI 0.88 and RMSEA 0.053; based on the obtained figures, it can be said that the present model has appropriate fitness with the data.

Moreover, coefficients of path analysis model for variables of payment mechanism were calculated (Table5). Based on this table, variable 2, establishing result-based payment system, had most parameter estimation.

Performance-based variables had 0.05 correlations with 0.52 coefficients with time-based variables at the level of probability. Covariance between variable errors 9 and 8 was -0.3 and between 4 and 7 was -0.19. Level of probability in both cases was 0.05. The impacts of variables 4, 12 and 13 were not meaningful; as a result, they were omitted. In general, payment mechanism in the process of strategic purchasing considers triple dimensions of: performance-based payment system, time-based payment system, and risk coverage. 1- Performance-based payment system includes variables such as: financial incentives, forecasting, etc. 2- Time-based payment system includes variables such as time of receiving service, etc. 3- Risk coverage includes variables such as: justice, financial protection.

4. Conclusion

The findings of the present study about the variables affecting payment mechanism for strategic purchasing in the indirect health section of Iranian Social Security Organization indicates that payment mechanism has triple dimensions of performance-based, time-based, and risk coverage. In a research by Barnum *et al.* in 1995, payment level and unit and the time of payment as well as different payment systems (fee-for-service and capitation) and their strong and weak points were implied. Capitation payment method in national medicine system of England

(Robinson & Grand, 1994), Argentina (World Bank Report, 1998), New Zealand (Wilton & Smith, 1998), and the United States (Feachem, 2000) has become operational. According to the World Health Organization Report in 2000, buyers must shift from payment mechanisms based on fee-for-service payment to those mechanisms covering risk; it is in accordance with the results of the present study. While examining the transition from the input-based payment system, bonus system and diagnostic affiliated groups are considered as well (Buss, 2008). The results of the present study emphasize on payment variables mechanism based on the results and bonus.

In a research conducted in Canada in 1999, the results focus on the increase of performance and the result of the purchasing system, which are among the expected results of strategic purchasing process and are consistent with the results of the present study about the performance-based payment mechanism. Langenbrunner *et al*. (2005) conducted a research in which they focused on time-based payment mechanisms, type of services and population, and payment system based on performance and delivered services and activities of diagnostic affiliated groups. Moreover, they examined performance-related payment systems and their results. According to their report, payment system is founded generally on prospective payment systems and has the ability to predict costs and forecasting, which is in accordance with the results of the present research in selecting performance-based and time-based payment mechanism.

The results of studying "shifting risk to service providers" and enhancement of production method and choosing risk by Manning (1998) confirms the results of the present study about the quality of delivered services. The research conducted by Langenbrunner *et al*. in 2005 affirms that most west European countries have chosen performance-based strategy in their payment system in hospitals. This system was used in Austria at the beginning of 1990s. Bocken (2008) in his researches considered establishing financial incentives and bonuses for health care providers (physicians) to improve the quality of care. Chalkley & Mcvicar (2008) carried out a research about payment system based on results of health care providers which is now being used in England. Langenbrunner *et al*. (2005) pointed to risk sharing, level of risk (group against individual) and protection (financial coverage) and justice against disease.

The result of the present study is applicable to those organizations involved in the process of purchasing health services. It can also be used in payment systems to service providers, physicians, etc. It is also important to mention that before the mechanism becomes operational, the payment systems and the current situation in any system must be examined and decisions should be made upon the obtained results of the survey. Meanwhile, the managers in the health field should be trained as well.

Finally, it becomes clear that payment mechanism enjoys special importance in the process of strategic purchasing and officials and authorities of health field should pay attention to it. Utilizing identified variables will be effective in improving the purchasing process in the Iranian Social Security Organization and other insurance organizations.

References

Aaron, H. J. (1991). Serious and unstable condition; financing Americans health care, Washington DC.

Barnum, H. kutzin, J. & Saxenian, H. (1995). Incentives and provider payment methods. *International Journal of Health Planning and Management*, 10: 23-45.

Bocken, J. (2008). Unterschiede in der Inanspruchnahme von Facharzten in der hausarztichen und in der hausarztzentrierten versorgung. Eine Analyse auf der Grundiage ausgewahlter fragen des Gesundheitsmonitors. To be published in: Das Gesundheitsweseen. Autumn.

Borges C., M. & Condoso, M., De F. (2008). International workshop- Gover nance of strategic purchasing in health sector may 14-15 (Bled) Slovenia, unidade operacional de financiamento contratualizaco.

Boyle, S. (2007). Payment by results in England. *Eurohealth*, pp. 13, 12-16.

Buss, R. (2004, 2008).,[Online] Available: European observatory on health systems and policies (July 10, 2010)

Chalkley, M. & Mc Vicar, D. (2008). Choice of Contracts in the British National Health Service: An empirical study. *Journal of Health Economics*. Pp. 27, 1155-1167.

Department of Health, (1993). Whaia te Ora mo te iwi: Maori Health Policy Guidelines to Regional Health. Authorities and the Public Health commission. Wellington: Department of Health.

Feachem, S. N. (2000). Managed care: the US experience. *Bulleting of the World Health Organization*, 78 (6) (in press).

Grignon, M., Paris, V. Polton, D. Couffinhal, A. & Pierrard, B. (2004). The Influence of Physician Payment Methods on the Efficiency of the Health Care System, in Changing Health Care in Canada, Romanow Papers, Vol 2, P. –G. Forrest, G. Marchildon, T. Mclnstosh (Ed), University of Toronto Press, pp. 207-239.

Habicht, J. K, X. Couffinhal, A. & Kutzin, J. (2005). Out-of-pocket Payments in Estonia: An Object for Concern? HSF Working Document, Health Systems Financing Programme, WHO Regional Office for Europe.

Hasanzadeh, A., & Fakhimzadeh, S. (2006). Organizational Reforms in Hospitals, Utilizing Market Interactions in Managing a Hospital, Tehran, High Research Institute of Social Security Organization.

Kline, R. B. (2005). *Principles and practice of structural equation modeling*. New York: The Gilford press.

Kutzin, J. & Couffinhal, A. (2005). Health Financing in Estonia: Challenges and Recommon dation, WHO Regional office for Europe, *Health system Financing*, CopenHagen, February.

Langenbrunner, J. C. Orosz, E. Kutzin, J. & Wiley, M. M. (2005). Textbook Purchasing and paying provider. (Chapt 11).

Manning, N. (1998) Unbundling the state: Autonomous Agencies and service Delivery, Draft world bank Discussion paper. Washington, DC: World Bank.

O'Neill, C. & Largey, A. (1998). The role of quality standords- accreditation in redressing asymmetry of Information in health care Markets. *Health Policy*, pp. 45, 33- 45.

Preker, A. S. & Harding, A. (2003). Innovation in Health Corporatization of public Hospital. Washington, DC. The World Bank. ISBNO-8213-4994-39. Part1 Overview of Market zing organizational Reforms (Chapters 1).

Preker, A. S. & liu, X. edit. Velenyi, V. & Baris, E. (2007). Public ends private means strategic purchasing of health services, The World Bank Washington DC. 20433 (Chapter 11).

Robinson, R. & Le Grand, J. (1994). Evaluating the National Health Service reforms. *Oxford Health Policy Joumals*, Transaction Books.

Statistical Indicators Report of the Social Security Organization, Health Department, 2008, No. 15th, Iran, Tehran, Social Security Organization

Wilton, P. & Smith, R. D. (1998). Primary care reform: a three country comparison of budget holding. *Health Policy*, 44 (2), pp. 149-166.

Workplace Safety and Insurance board health Care Model, Canada (1999).

World Bank, Argentina. (1998). Facing the challenge of health insurance reform. Washington, DC, The World Bank, (LASHD ESW Report 16402- AR).

World Health Organization (2000). The World Health Report: Improving Health system performance. Geneva: WHO.

Table 1. Impact of payment motivation in different methods (Preker *et al*, 2007)

Payment Method	Risk to	Probable impact on the performance of health section				
		Access/financial Protection	Quality	Expenditure	Efficiency	Simplicity of implementation
Line item budget	Provider	+	+	+++		+++
Salary	Buyer	++++++	++	+++	+	+++
FFS incentive	Buyer		++			
In-patient Day	Buyer		+			+
Per case	Provider		++	+	+++	
Global budget	Provider	+	++	++	+	+
Capitation	Provider	+	+	+++	+++	+
Performance-based payment	Buyer	+	++	+	+	+

Table 2. Payment mechanism to the health care providers

Payment Mechanism	Preventing Health Problems	Delivering Services	Responding to Legal Expectations	Reducing Costs
Line item budget	+/-	--	+/-	+++
Global budget	++	--	+/-	+++
Capitation (with competition)	+++	--	++	+++
Diagnostic-Related Group (DRG)	+/-	++	++	++
Fee for Service	+/-	+++	+++	---

+++: very high positive effect   ++: limited positive effect   +/-: low or nothing effect

___: very low negative effect   __: limited negative effect world health report, 2000

Table 3. Average and standard deviation for the variables of payment mechanism for strategic purchasing

Row	Variables	Average	Standard Deviation
1	Creating motivation and financial incentives for health care providers	4.32	0.776
2	Establishing result-based payment system with efficiency in health system	4.31	0.645
3	Creating performance-based motivations for the employees of the health field	4.21	0.650
4	Direct payment to service providers	2.24	1.275
5	Indirect payment to service providers	3.80	0.786
6	Justice against disease risk	3.99	0.716
7	Financial protection against disease risk	4.06	0.731
8	Transferring financial risk to service providers	2.89	1.245
9	Ability to predict costs and prospective payment system	4.23	0.597
10	Retrospective payment including: bonus payment/salary/fee for service	2.98	0.925
11	Retrospective payment including: case payment, daily payment, capitation payment and budget	3.91	0.925
12	Unit Payment	3.35	1.06
13	Payment method based on D.R.G	3.96	0.887

Table 4. Load factor of payment mechanism variables on factors 1, 2, and 3 after Varimax rotation

Variable	First factor	Second factor	Third factor
4	0.817		
12	0.623		
9	0.601		
13	0.459		
10		0.708	
11		0.661	
3		0.629	
5		0.568	
6			0.787
7			0.738
1			0.576
8			0.525
2			0.379

Table 5. Coefficients of path analysis model in payment mechanism

Latent variables	Parameter estimation	t	Standard deviation	R^2
1- performance-based	0.35	3.89	0.47	0.20*
2- performance-based	0.66	5.54	0.089	0.78**
2- time-based	-0.34	-2.82		
3- performance-based	0.50	7.23	0.17	0.60**
5- time-based	0.38	3.18	0.47	0.24*
6- performance-based	0.29	3.95	0.21	0.57**
6- risk coverage	0.45	4.06		
7- risk coverage	0.49	3.96	0.31	0.40**
8- risk coverage	0.48	3.19	0.89	0.20*
9- performance-based	0.23	3.69	0.31	0.18*
10- time based	0.62	5.66	0.29	0.50**
11- time based	0.48	4.10	0.27	0.27*

* $P<0.05$ ** $P<0.01$
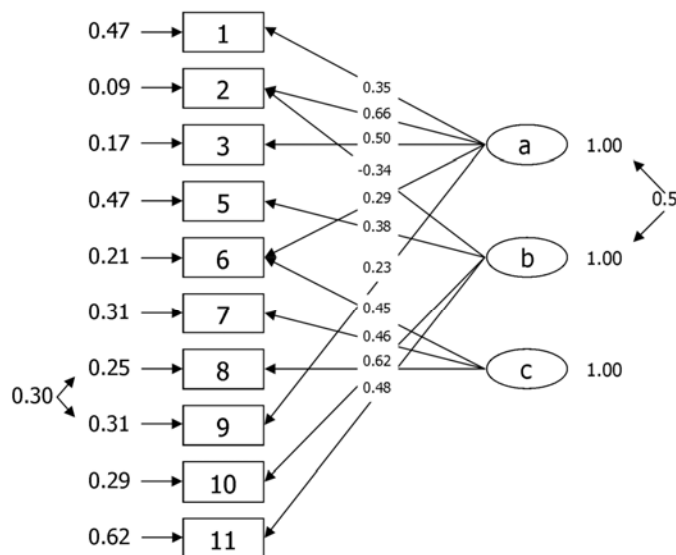
Chi-Square= 38.03,   df= 31,   p-value= 0.17972   RMSEA= 0.053

Figure1. The model of payment mechanism for strategic purchasing in health sector of ISSO

(Performance-based, time-based, and risk coverage partial dimensions)

Study on the Collaborative Innovation Oriented SDN Enterprise Ecological Collaboration Model

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Abstract

By comparing the similarities between SDN (Supply and Demand Network with multifunctional and opening characteristics for enterprise) and natural ecosystem, the ecological characteristics of SDN enterprise are summarized in this article. The relationship among biological species groups in the natural ecosystem is used to describe the relationships of SDN enterprise in the collaborative innovation, and the collaborative innovation model among SDN enterprises based on the biology is generalized. In addition, four kinds of collaborative innovation oriented SDN enterprise ecological collaborative models are expounded respectively in detail.

Keywords: SDN enterprise, Collaborative innovation, Biology, Collaboration model

1. Introduction

The cooperation and win are the targets of the supply and demand network with multifunctional and opening characteristics for enterprise (SDN), and in the whole world, its target is the acquirement of the sources in the whole world, the manufacture in the whole world, and the distribution in the whole world, and the supply and demand network structure with multiple functional and opening characteristics will be formed among relative enterprises because of the interactive function of "supply and demand flow", with many characteristics such as networking, multifunction, sufficient opening, and dynamic stability (Xu, 2002, P.19-22). SDN enterprise collaborative innovation means that enterprises fully utilize the asymmetries of the SDN nodes (such as enterprise, enterprise alliance, and economic man) in the core business, the knowledge structure, and innovational skills, with the help of various networking collaborative work environments, innovational design tools, and knowledge integration means, to complement innovational advantages each others, provide innovational products and services, stimulate and enhance the total innovational ability of SDN, and realize the cooperation and win in the whole world, by various multi-layer collaborations of supply and demand flow (Chen, 2011).

SDN is the node set with complex network structure based on many supply and demand relationships, and SDN enterprise is one of common SDN nodes, and is the minimum node unit with independent operation ability. The multiple characteristics of SDN enterprise determine that SDN enterprises would have many different collaboration modes in the collaborative innovation. Because there are many similarities between SDN enterprise and natural ecosystem, it is very important to utilize the ecological idea to study the SDN enterprise collaborative innovation mode, support the collaborative innovation process, and enhance the collaborative innovation effect.

2. Biological characteristics of SDN enterprise

The concept of ecosystem was first proposed by British botanist A. G. Tansley in 1935, and it meant the dynamic compound formed by material circulation and energy flow, with reciprocity, interdependency, and self-organization function, in the biological population and interactive natural environment (Bai, 2007, P.174-178). In the long-term evolution of biological populations, many relationships such as predation, competition, autoeciousness, intergrowth, and reciprocity would respectively form among different biological populations. As viewed from the ecology, SDN enterprises would form SDN according to certain structure, with many similarities with the natural ecosystem, but it is an artificial ecosystem. Table 1 shows the comparison between the natural ecosystem and the SDN artificial ecosystem from structure and characteristic (Xu, 2006, P.97-100).

Because SDN has many similar characteristics with the natural ecosystem, the research method of the natural ecosystem could be used to study the SDN enterprise collaborative innovation mode.

3. SDN enterprise collaborative innovation model based on the biology

SDN is an artificial ecosystem, and it could use the relationship among biological populations in the natural ecosystem to describe the relationship among SDN enterprises in the collaborative innovation system, and

summarize the collaborative innovation model among SDN enterprises based on the biology, as seen in Table 2.

By using the division mode of the biological populations to analyze the enterprise relationship in the SDN enterprise collaborative innovation, and eliminate the situations without collaborative innovation among SDN enterprises (such as interior collaboration, independent innovation, and exclusive innovation), four SDN enterprise collaborative innovation models such as the homogeny strengthened model, the heterogeneous complementary model, the single-directional dependence model, and the multi-directional interaction model could be identified.

4. Analysis of the collaborative innovation oriented SDN enterprise biological collaboration model

4.1 Homogeny strengthened model

In SDN, homogeneous enterprises mean those enterprises which could produce like products or provide like services, and they all face same market, and similarly use limited production resources, so they have indirect limitation relationship among them. Because of different inborn conditions of homogenous enterprises, such as enterprise scale, human resource, and capitals, the core abilities of enterprises are obviously different, so SDN enterprises would be at different biological niches. The biological niches mean the resource demand capacity and core business ability of SDN enterprise according to the environment. The difference of the SDN enterprise biological niches and the limitation of the resource and market would produce the collaborative innovation drive of SDN enterprise, and many homogeneous enterprises with high biological niche occur, with strong core business ability, and to keep the exclusive advantage of the core business ability, realize the sustainable development of enterprise, and seek the innovational breakthrough of development, they will enhance the biological niche by the collaborative innovation. Those SDN enterprises with lower biological niche will strengthen the innovation pressure because of the competition effect, and to survive and development, they must separate them from the lapped biological niche and seek higher biological niche, which will also promote many SDN enterprises to improve the quality of product and service and enhance the core business ability by the collaborative innovation. Based on the concept of cooperation and win-win, homogeneous enterprises would not acquire the route of existing biological niche by traditional drastic competition, and they would create layered different biological niches by the collaborative innovation, and reduce the competition in the limited market resources, and strengthen the whole collaborative innovation capacity.

4.2 Heterogeneous complementary model

The heterogenic characteristic of SDN enterprises determines that two or more enterprises belong to heterogeneous enterprises. There are two kinds of relation among heterogenic enterprises. The first one is the collaborative function among SDN enterprises because of the business flow, with the direct upstream and downstream relation between supply and demand, by which enterprises would have close relation, and depend on each other. The other one is the direct association among enterprises without the relation between supply and demand, by which enterprises would have incompact association through multiple transfers of the relation of supply and demand. Usually, the former instance would exist in heterogenic enterprises. The formation of the supply and demand relation among SDN enterprises is a continually attempting and adjusting process, and according to the demand of the market, SDN enterprises would form relatively stable supply and demand network gradually through long-term selections. Heterogenic SDN enterprises have multilateral dependences, and though the multilateral dependences will change dynamically, but to sustain the relatively stable supply and demand relation, SDN enterprises will keep various collaborations with the cooperative enterprises. Innovation is the necessary selection for each SDN enterprise in the operation to keep the core ability, and when certain one enterprises in the supply and demand network begins to innovate, the cooperative heterogenic enterprises will also develop the collaborative innovations as viewed from the business complement to complement of innovational resources and results and keep relatively stable supply and demand relation.

4.3 Single-directional dependence model

Single-directional dependence-type SDN enterprise collaboration innovation model is a kind of asymmetric innovation, and a kind of parasitic behavior model. Whether for homogeneous enterprises or for heterogenic enterprises, one party in the cooperative enterprises (host enterprise) could not exclusive occupy the innovational result after investing innovational resources and acquiring innovational result, and because of the demand of the collaborative business, it will share the innovational result with the other party (parasitic enterprise) without paying for innovation, so the parasitic enterprise would have single-directional dependence to the host enterprise. Host enterprise and parasitic enterprise many be homogenous enterprises, or heterogenic upstream and downstream enterprises, and the single-directional dependence relation is a kind of special integration collaboration in essential, and the parasitic enterprise utilizes the innovational result application of the host enterprise to acquire extra income, and the share of the income will reduce the income of the host enterprise. In SDN, the single-directional dependence relation is only the short-term relation, and the collaborative innovation is the positive function behavior to promote and influence each other, and the negative function of the parasitic relation would reduce the innovation drive of the

host enterprise. At the same time, the host enterprise could not ignore the division of the parasitic enterprise for the income, and to reduce the flow of the income, it would eliminate the parasitic enterprise and seek new supply and demand relation, and the parasitic enterprises in the innovational disadvantage must continually enhance the innovational ability and provide the innovational result which can be shared, to keep the relation of collaborative cooperation. Therefore, the single-directional dependence relation may break up, or change to the intergrowth collaboration relation or the multi-directional interaction relation.

4.4 Multi-directional interaction model

The multi-directional interaction model means that SDN enterprises with multiple supply and demand relationships have a kind of interdependent and mutually promoted ecological structure in the collaborative innovation, and based on the division and cooperation, they can realize the value increment which could not be realized by single enterprise by the collaboration of various supply and demand flows. The enterprises with multi-directional interaction innovation have certain dependence relationship, and they need sufficient communication, and they should respective contribute and share their own stage achievements, and support the collaborative innovation, and the deficiency of any one part would delay the collaborative innovation course and fail the collaborative innovation.

5. Conclusions

Based on the similarities between the SDN and the natural ecosystem, the ecological ideas are used to summarize the ecological characteristics of SDN enterprises, and describe the relationship in the SDN enterprise collaborative innovation process by the help of the relationship among biological populations. Four kinds of SDN enterprise ecological collaborative model facing collaborative innovation are expounded in detail, and the research result of this article could be used to instruct the collaborative innovation for SDN enterprises to some extent.

References

Bai, Zhiyong. (2007). Thinking about the Ecosystem Characteristics Based on Systems Science. *Journal of Central South University of Forestry & Technology.* No. 12(6). P.174-178.

Chen, Li & Xu, Fuyuan. (2011). Research on SDN Enterprise's Collaboration Innovation Mechanism. *Asian Social Science.* No.1.

Xu, Fang & Li, Can. (2006). The Ecological Study on Industrial Cluster. *Ecological Economy.* No. 10. P.97-100.

Xu, Fuyuan & He, Jing. (2002). First Study on Supply and Demand Network with Multi-functional and Opening Characteristics for Enterprise. *Forecasting.* No. 21(6). P.19-22.

Table 1. Comparison of the similarities of SDN and natural ecological system

		Natural ecosystem	SDN artificial ecosystem
Structure similarity	Composing factors	Living beings, with diversity: producers, reducers, inorganic environment, consumers	SDN enterprises, with diversity: suppliers, manufacturers, logisticians, management environment
	Relationship	Mutual influence and independence between factors and environment, and among factors	Mutual action, influence, and dependence among SDN enterprises, and between enterprise and management environment
	Systems	Various composing factors form the total structure of the system according to certain structure	SDN enterprises form the SDN structure through the supply and demand relationship
	Layer	Individual, species group, community	SDN enterprise members, SDN enterprises
	Openness	Opening system: energy input, cycle, output	Opening system: resource input, processing, output
	Feedback	Positive and negative feedback	Positive and negative feedback
	Value structure	Food chain, food network	Innovational value chain, innovational value network
Characteristic similarity	Function	Cycle of matters, energy flow, biology evolution	Supply and demand flow, information sharing, collaborative innovation
	Environmental influence	Survival of the fittest	Survival of the fittest
	Self-organization	Self-adapting, self-regulation, self-organization	Self-adapting, self-regulation, self-organization
	Dynamic characteristics	Production, development, evolvement	Entering network, development, evolvement
	Stability	Evolving continually, dynamically stable	Evolving continually, dynamically stable

Table 2. Ecological collaborative innovation model of SDN enterprise

Species relationship	Relationships among species	Relationship among SDN enterprises	Collaborative innovation model
Preying	Species A preys species B	Enterprise A annexes enterprise B, belonging to same one enterprise	Interior collaboration
Competition	Species A and species B restrict each other	Homogenous enterprise A and enterprise B influence each other	Homogenously strengthening
Autoeciousness	It is advantageous to the parasitic species A, and it may be advantageous or disadvantageous to the species B, or influence nothing	Enterprise A depends on the innovation of enterprise B The innovation of enterprise A influences the development of collaborative enterprise B	Single-direction dependence Excluding innovation Single-direction dependence
Intergrowth	Species A and species B depends each other	Heterogeneous enterprise A and enterprise B have direct supply and demand relationship	Heterogeneous complementation
Reciprocal	Species A and species B are advantageous to each other	Enterprise A collaboratively cooperates with enterprise B	Double-direction interaction
Laterality	It is advantageous to specials A, and it influences nothing to species B	The innovation of enterprise B is advantageous to the collaborative enterprise A	Single-direction dependence
Amensalism	It is disadvantageous to specials A, and it influences nothing to species B	The innovation of enterprise B influences the development of the collaborative enterprise A	Excluding innovation
Neutral	Without relationship between species A and species B	Enterprise A has no intersection with enterprise B	Independent innovation

Exploring Workplace Bullying in a Para-Military Organisation (PMO) in the UK: A Qualitative Study

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Abstract

Research into workplace bullying is taking various turns with most of the studies broadening understanding of the concept. Although much progress has been reported in research on the understanding of what is workplace bullying, its effects and how to deal with it. In this paper, exploratory semi-structured interviews were conducted on twenty-five participants to create a better understanding of their experiences of workplace bullying in a para-military organisation in the UK. This method of data collection helped to understand how things happen and why it happened in the para-military organisation. The study revealed that workplace bullying is as a result of organisational change, organisational division into uniformed and non-uniformed staff, power relations, management style and witnessing bullying. The study also revealed that workplace bullying has a detrimental effect on the physical and mental health of the victim. While all the accounts discussed above were given by those who have experienced workplace bullying, the key informants within the organisation gave conflicting account of what is going on in PMO. The findings revealed different views to bullying within the PMO. It may be concluded from this study that bullying is part of the culture of this organisation, and that may be why it is perceived to be accepted as a norm and is continuing.

Keywords: Workplace Bullying, Negative Effect, Para-Military Organisation

1. Introduction

The existing literatures such as Einarsen (2006), Lewis and Gunn (2007), Leymann (1996) Salin (2004) and Sheehan (2006) have shown that there are various approaches to study bullying in the workplace. These approaches have led to a series of debates on how to define workplace bullying. To date, there has been no general agreement on the definition of workplace bullying. However, even with several conceptual and methodological differences across various studies, there has been a growing convergence of definitions of workplace bullying in recent years by researchers, practitioners, organisations and even government. For instance, research by the Department of Trade and Industry (DTI, 2007) is an indication of the government's concern regarding workplace bullying. The research was aimed at providing comprehensive results on the extent of unfair treatment, discrimination, bullying and sexual harassment at work. The study reported a high incidence rate of bullying in the British workforce with about 3.8% of the employees reporting to have experienced bullying at work within the last two years (DTI, 2007).

When considered together, however, and with ongoing research on workplace bullying, it is obvious that workplace bullying is a problem facing employees and employers in the UK. The evidence has revealed that workplace bullying has negative consequences. It impacts negatively on the organisation (Hoel, Einarsen & Cooper, 2003), and the individual (Einarsen & Mikkelsen, 2003; Sheehan, 2006). In addition to the effects on the recipients, studies have shown that those who have observed or witnessed workplace bullying are also likely to experience some of the negative consequences (Hoel & Cooper, 2003; Vartia, 2001; Zapf, Einarsen, Hoel & Vartia, 2003). In this paper, exploratory semi-structured interviews were conducted to create a better understanding of the employees' experiences of workplace bullying in a para-military organisation in the UK.

2. Antecedents of Workplace Bullying: Literature Reviewed

Workplace bullying commonly happens in organisations where dominant subordinate hierarchical relationships exist, for example, where there are quasi-military supervision arrangements (McCarthy *et al.,* 1998). Many of the tactics used by the perpetrators are initially subtle and covert, but intensify over time into threatening and demeaning

behaviours (Di Martino, Hoel and Cooper 2003). At the organisational level, culture, organisational structure, and job design are all components that can enhance the climate for workplace bullying (Salin, 2004). For instance, bullying may be prevalent in organisations where confrontation is part of the working culture or is encouraged, and where perpetrators feel there are no recriminations for their actions (Sheehan, 2006). In regard to the organisational climate, changes such as restructuring, globalisation, downsizing, and competition have all contributed to the increase in bullying within the work environment (see Archer, 1999; Vartia, 2001; Sheehan, 2006).

Other factors identified at the organisational level that have contributed to the increase in workplace bullying include leadership style (Skogstad, Einarsen Torsheim, Aasland & Hetland, 2007), job design (Salin, 2004) and the features of work (Vartia, 2001). Other research has focused on two main explanations for workplace bullying, namely the psychosocial work environment and personality or individual characteristics (Einarsen, 1999). At the individual level, workplace bullying focuses on the personalities and characteristics of the targets, the perpetrators and the organisation (Einarsen and Mikkelson, 2003; Vartia, 2001). The personality of the bullies and the victims are the individual antecedents which, according to Coyne, Seigne and Randall (2000) are causes of exposure to bullying. Characteristics in terms of demographic factors may help to explain why some individuals are subjected to more acts of bullying than are others (Einarsen, 2000; Lewis & Gunn, 2007; Salin, 2004). Gender appears to be one of the most debated factors that contribute to the risk of being bullied (Vartia & Hyyti, 2002). Studies have shown that the less-represented gender in a work environment is more targeted than the more-represented one (see Einarsen, 2006). Power relations underpin many of the arguments pertaining to workplace bullying and may be linked to all the levels at which workplace bullying can occur. Workplace bullying, according to Turney (2003), does not occur between parties of equal power, but rather arises when conflict occurs between people with different strengths. Power imbalance is demonstrated through a wide range of situations such as gender, physical size, age, position and grade within the organisation, educational qualification, and intelligence. Other parameters, such as the inability to defend oneself, silence, and being non-confrontational, are some of traits associated with power relations (Branch, Ramsay & Barker, 2006; Salin, 2004). It is stressed that many different sources of power exist in an organisation, but in the case of workplace bullying, it rarely comes as physical strength, but rather as 'legitimate power' possessed due to hierarchical positions occupied by members of the organisations (Salin, 2004; Turney, 2003). Power imbalance is often supported with an argument that the targets or victims of bullying cannot defend themselves on an equal basis (Vartia, 2001; Salin, 2004). Power imbalance can take different forms, such as the formal power differences found in a highly structured organisation with ranks and grades (Archer, 1999), social group (Salin, 2004), abusive supervision (Tepper, 2000), and ganging up.

3. Individual's Perception of Bullying Behaviours

A person's perception of behaviours or incidents and meanings and reactions are crucial to the understanding of workplace bullying (Liefooghe & Olafsson, 1999). Studies have shown that individuals' perception of bullying incidents is dependent on the available social representation (see Lee, 2002; Vartia, 2001; Zapf & Einarsen, 2003). In describing workplace bullying, several interpretations of the acts of bullying have been given, such as belittling, trouble maker, insecurity, bad mood, divide and rule, embarrassment, injustice, hypocrisy, control, power, downsizing, stress, and weak personality (Liefooghe & Olafsson, 1999). Those who experience being bullied have a corresponding set of shared beliefs, attitudes and behaviours which need to be identified in order to be able to understand the individual's interpretation of a particular situation (Liefooghe & Olafsson, 1999). In this study here reported, exploring people's interpretations and representations has enabled a more detailed view of workplace bullying to be taken (following Einarsen, 1999).

4. Method

Semi-structured interviews were conducted on the 25 participants. This method of data collection can be used to for exploratory and explanatory research, which will help to understand how things happen and why it happens . The choice of this method was used to identify the relationships between employees and workplace bullying (following Saunders *et al*., 2007). This method was chosen because it has helped to provide a detailed account of the social, political and organisational processes that might have affected employer-employee relationships in the organisation (following Ghauri & Gronhaug, 2005). It was also chosen for its flexibility because it allows varying order and logic in the conversations (following Ghauri & Gronhaug, 2005; Saunders *et al.,* 2007). The semi-formal nature of the interviews allowed the maximum exploration of the employees' accounts of their experiences of workplace bullying. Within the workplace bullying literature, researchers such as Branch (2006) and Salin (2004) have proposed that qualitative studies on workplace bullying would increase our understanding of the processes involved in workplace bullying.

4.1 Results

Participants

Participants were interviewed once and a total of twenty-five interviews were conducted. Eight of the participants were key informants within the organisation, ten were uniformed or operational staff, and the remaining seven were non-uniformed or support staff. Obtaining information that cuts across the operational and functional groups meant the data collected was rich in source and since the research is exploratory in nature, new insights were developed concerning the understanding of workplace bullying. The response rate for the interviews was low, but this is expected for this kind of study, whereby most of the victims of bullying are reluctant to come out and share their experiences because they are afraid that they could be further victimised (Saunders *et al*., 2007). Also some people might find sharing their experiences of workplace bullying too traumatic and distressing, so they will rather not talk about it again. Nonetheless 25 responses can still be regarded as sufficient for a qualitative study (Atkinson *et al*., 2003). Given the consistency in most of the answers given by the respondents, the sample size therefore could be considered adequate for this research (following Glaser & Strauas, 1969).

5. Findings

The interviews conducted were semi-structured and previously identified themes were used to accelerate the initial coding phase of the analysis. These themes on which the analyses are based are as follows: the position of the participants within the organisation; how a respondent knew he or she was being bullied; who were the alleged perpetrator(s); the surrounding circumstances when the participant was bullied; the number of times the bullying occurred; the types of bullying experienced; the effects of the bullying; and the roles played by the management of the PMO. Out of the twenty-five interviews conducted, only two cases will be presented. These are, one most elaborate case of the bullied employee and the key informant.

Case 1

Gill (A non-uniformed member of staff felt bullied by Mark: A senior uniformed member of staff

➢ *Gill has been working for PMO for 20 years. Gill reports that there has been a recent change in the promotional system, whereby employees have to prepare for an oral and written assessment in order to get promoted. Gill made an official report on the how the new promotional system might affect the organisation, especially negatively. Mark started picking on him and would constantly verbally abuse Gill in the staff room. A formal grievance was brought against Gill for resisting change, and Gill was bought to the disciplinary hearing. All the people that testified were senior uniformed member of staff. Gill was accused of undermining and demeaning the authority of the management. Gill noticed that Mark was eavesdropping and monitoring him. Gill almost resolved into quitting his job. Gill reports that he has lost his health and reputation thanks to Mark. Gill is presently on anti-depressant and finds it quite scary going to work everyday. All Gill is left with is resentment for the organisation and just waiting for his retirement. Gill now goes to work late, leave early and doesn't care about the job any more.*

Case 2

Leo (A key informant in the organisation)

Leo reports that the change in the promotional system is a move towards achieving maximum performance, which centres on getting the right people to work for the PMO. Leo said this initiative has ensured that the right people who are performance driven, are the ones occupying strategic positions in the organisation. Leo reports that those employees who are not happy with the change are just being rigid, scared and are resisting change. Leo said most of them are the older employees, with longer length of service in the organisation. They don't want to embed changes and modernisation. Leo further reports that there is a general misconception and a wrong perception among many staff that the senior managers are the bullies and that bullying is going on in PMO. However, Leo said that he cannot conclusively say that bullying is not going on, but there is no evidence to support it. Leo said that there have not been cases of increased absenteeism, grievances brought against anyone, high labour turnover or an increase in the amount of sick leave taken, which are some of the expected effects of workplace bullying on those who have experienced bullying.

6. Understanding Workplace Bullying in PMO

These summarised cases analyses suggest that workplace bullying is as a result of the following factors, organisational change, organisational division, power relations, management style and witnessing bullying.

6.1 Organisational Change

Organisational change emerged as one the causes of the increase in workplace bullying in the PMO. Organisational change, according to McCarthy *et al.* (2005), can affect how we organise ourselves and how relationships work among individuals, institutions and communities. The changes reported in this situation have affected some of the

employees negatively. With respect to the situation in PMO, six of the participants reported that the changes, especially those related to the speed of change, the promotional system and the new assessment centre, have affected them negatively. These accounts indicate a change in the promotional system from one based on experience, duration of service and performance to that of written assessment and role playing. When change creates an avenue for uncertainty, anxiety, stress, fear and confusion to increase, it can lead to unhealthy competition among employees (for instance, those applying for a higher position), which if not well managed might lead to acts of aggression towards one another (Hoel & Cooper, 2003; Salin, 2004). When conflicts between the employees are not managed properly, it can lead to aggression, which if not truncated, may result in bullying tactics.

6.2 Organisational Division

Drawing from some the characteristics of the organisation, the PMO is known for its masculine culture, for being highly structured, power based and male dominated, and for the group identification therein. Two main sub-themes emerged from the analyses of organisational division, which are operational division and rank. Operational division focuses on the position, duties and roles that the perpetrators and the victims play within the PMO. This assertion is based on the finding that the operational group and the position of the victim is a factor that can increase the likelihood of being exposed to bullying. The different accounts of the participants split operational division into two groups, which are the two main functional groups: the operational or uniformed staff, and the support or non-uniformed staff. For some of the participants, they believed that *those who are uniformed are given a form of priority over the non-uniformed*, which implies that there is a sense of inequality among the two functional groups.

For five of the participants, *being a member of the support staff is a vulnerability factor, and they all believe that the management are turning a blind eye to bullying, especially if it comes from the uniformed ranked officers towards the support staff.*

Others blamed on the rank structure of the PMO; that is, the higher your rank, the more powerful you are in the organisation. For most of the participants, the bullies are those with high ranks. Reference to the bully as *untouchable* by one of the participants is an indication of a total surrender on his part and helplessness in this situation.

6.3 Power

Power is the third theme that emerged under the causes of bullying in the PMO. A number of sub themes emerged. Three sub-themes are discussed in this section: gender, hierarchy, and group identification. All four of the women interviewed believed that they were bullied because of their gender and the inability of the majority of the men to accept them into the PMO. Gender in this case is a vulnerability factor. The reports given by some of the participants identified the managers and people within the higher levels of the hierarchy as the bullies. Nine of the participants reported that they were bullied by someone above them because the bullies have the power to do so. In this situation, the bully could equally be either uniformed or non-uniformed staff. Some of the interviewees reported that, most of the bullying is top down with the management of the PMO having full knowledge of such bullying behaviours. For some of the non uniformed participants, they were bullied by a group of uniformed staff. The identification with an in-group could trigger conflicts with an out-group, which could further lead to either direct aggression or indirect aggression towards each other. Others blamed it on peer pressure, which is akin to a group influence on one another. That is, people imitate one another, especially when they belong to the same social group.

6.4 Management

The management emerged as one of the causes of bullying and another factor that had increased the prevalence of bullying behaviours in the PMO. Most of the participants blamed it on the management, especially with the divide between the uniformed and the non-uniformed staff. Most of the accounts given by the participants indicated some ineffective management of employees. For instance, some participants reported that *the change in the promotional system was too fast and not well communicated*. For some of the participants, *the change was not needed*. However, realistically, in any dynamic organisation, change is inevitable. Good management of change therefore requires taking into account the resistance of employees to that change. Thus, in order to reduce the resistance, the change should be communicated properly, the impact of such change on the employees should be considered and the change should be well planned, executed and managed.

6.5 Deficiencies in the Work Environment

Other accounts of causes of bullying identified deficiencies in the work environment. Gill said that he was bullied because he made various concerns about standards within the organisation. He reports that he *started hitting the (brick walls) and being poorly treated and bullied,* as a result of raising some concerns about the new promotional system. Furthermore, the lack of consistent policies for handling bullying cases is another factor that was reported in

this study. For instance, the application of equal negative sanctions for the bullies irrespective of their level in the organisation or their operational roles and duties within the organisation. It appears that for most of the participants who were bullied by their managers or people with higher ranks, nothing was done to the bullies. An extreme case of a lack of consistent policies in handling workplace bullying left the victim with no choice but to leave PMO. For one of the participants, she wou*ld rather not report bullying because the bully is one of the management team.* Information like this might suggest that the same rule does not apply to all bullying cases and employees are treated differently. That is, if bullying occurs between employees at a lower level, the management might be strict when handling such cases. However, if a case is brought against a senior member of staff, it is not handled fairly.

6.6 Witnessing Bullying as Vulnerability Factor

Witnessing bullying is an under explored area in the literature on workplace bullying. This factor emerged as a result of identifying that witnessing or observing bullying is another factor that can increase the likelihood of been subjected to bullying. Five of the participants reported that they became targets of bullying after witnessing others been bullied. *One of the participants was able to substantiate his experiences of workplace bullying with documents. Taking up a bullying case in this situation has exposed the participants to bullying by the alleged perpetrators.* Counter-reactions like this form one of the reasons some people who have observed or witnessed bullying in the workplace do not do anything about what they have experienced. The fear of being picked on or used as a scapegoat has discouraged other witnesses of workplace bullying to come forward.

7. The Effects of Workplace Bullying

The themes related to the effects of workplace bullying on those who have experienced it are discussed. Two main themes emerged, and each theme is further divided into sub-themes. The first theme addresses the personal effects of bullying, while the second theme is work and organisation.

7.1 The Personal Effects

One of the impacts of workplace bullying is a detrimental effect upon the physical and mental health of the victim. All of the participants reported that it has indeed affected their health. Most of the participants reported a physical condition, including hair loss, weight loss, rashes, headaches, and even pregnancy miscarriage for one of the female participants. For others, the effects of the bullying they experienced were psychological. Eight of the participants reported that they experienced anxiety symptoms such as sweating, feeling uncomfortable, frightened and scared any time they were around the person(s) by whom they were bullied. Two of the participants reported that they experienced a nervous breakdown. Thus, all the participants reported that the effects of bullying on their health were severe, especially as most of the cases of bullying reported continued for more than two years.

In addition to the personal effects, all the participants reported that the bullying they experienced affected their family life. For instance, one of the participants reported that the bullying she experienced affected her relationship with her husband, especially when she stopped talking to him. These reports reflect how workplace experiences can have a negative effect on the participant's lifestyles.

7.2 The Effect on the Work and Organisation

The second theme that emerged from this phase of analysis is the effect of bullying on the work of employees and the PMO as a whole. According to the participants, their experiences of bullying have affected their work and especially their attitude to work. Four sub-themes, which are a loss of respect for the management of the PMO, reduced commitment, worsening attitude to work, and reduced performance emerged. Six of the participants reported that their performance and productivity had reduced since they experienced workplace bullying. The reduced efficiency in this case can be interpreted as deliberate, especially since the victim perceived the management of the PMO as not keeping to their psychological contract of maintaining a safe work environment.

Others reported that the bullies are unrepentant and that they have lost trust in the management of the organisation. Most of the participants said they were angry, bitter, and no longer committed to the organisation or efficient at work. Thus, these types of psychological detachment from the PMO will have an adverse effect on the performance and the productivity of the participants and the organisation as a whole. From these analyses, it appears that the effect of bullying on the recipient is a factor of the type of bullying experienced and the duration of exposure to the bullying.

8. Workplace Bulling from the Key-Informants Perspective

While all the accounts discussed above were given by those who have experienced workplace bullying, the eight key informants gave conflicting account of what is going on in PMO. Three themes emerged from the analysis of the information collected from the key informants: change, no evidence of bullying and pressure of work. The main

change, as discussed previously, centred on the promotional system and the introduction of an assessment centre as a means of promotion of individuals to the next level. All of the key informants were in agreement and supported the initiative. For instance, Leo said that the *change in the promotional system is a move towards achieving maximum performance, which centres on getting the right people to work for the organisation.*

That is, the key informants reported that the new assessment process has helped the management of PMO to identify the right people to implement the other changes in progress. Thus, one of the participants referred to those employees who are not happy with the change as just being *"rigid, scared and anti-change"*. Thus, there are two sides to these experiences. First, there are those who do not support the change *(anti-change)*. They are the employees who believe that the change in the promotional system will lead to a situation where employees with inadequate experience and qualifications are occupying various positions. Secondly, there are those in support and in favour of the change *(pro-change)* and they believe that the PMO is moving towards modernisation. These two different views are an indication of the support from employees for change, or their resistance to and inability to embed change. For those that were seen as resisting the change, clear justification of their reasons for not supporting the change are apparent.

8.1 No Evidence of Bullying

Most of the key informants believed that there is a general misconception and a wrong perception among many staff, that the senior managers are the bullies and that bullying is going on in PMO. However, most of them reported that they cannot conclusively say that bullying is not going on, but there is no evidence to support it. This finding stands in contrast to the reports of those who have been bullied. The key informants reported that there have not been cases of increased absenteeism, grievances brought against anyone, high labour turnover or an increase in the amount of sick leave taken, which are some of the expected effects of workplace bullying on those who have experienced bullying and the organisation as a whole. The inability to support the various accounts of bullying with reports that have been made and evidence that has been brought forward renders them, according to the key informants, mere speculation with nothing to back them up. These statements contrast completely with some of the effects of workplace bullying reported in the literature; that is, workplace bullying can affect the performance and productivity of employees, and increase absenteeism, sick leave, and labour turnover. However, in this study, the reports given by the key informants show none such effects have been reported; rather, the evidence suggests employees work for the organisation until they retire. Furthermore, some of the key participants also revealed that, some of those people who have reported having been bullied *might be too sensitive and not tolerant enough*; that is, for some of the alleged bullying cases reported to researcher, what is perceived as bullying behaviours might just be misinterpreted actions or gestures. For instance, one of the most reported types of bullying by the recipients is *being shouted at*. However, Gill made a clear distinction between being shouted at and the raising of one's voice.

Raising your voice is quite different: I have raised my voice in a sense of urgency; it is different when you are in an office or when you are discussing something

The wrong interpretation of an act such as this might be perceived as bullying from the perspective of the person on the receiving end.

8.2 Pressure of Work

The inability to cope with the pressure of work and performance has put managers under tremendous pressure. The need to perform can make managers behave in certain ways and, if such actions are not managed and communicated properly to their subordinates, might lead to a situation where such actions are perceived as bullying behaviours. All of the key informants made a very significant statement about the workload of managers and how the pressure to perform could increase the threshold for reacting to bullying behaviour. However, given such pressures of work and the need to perform, they reported that most of the managers are sufficiently well trained and experienced to be able to balance the demands of the work whilst ensuring that they are behaving in an appropriate manner towards their staff and colleagues. Hence, according to the key informants, there is no evidence that bullying is going on. All the parameters that can be used to measure or determine the occurrence of bullying, such as absenteeism, labour turnover, increased sickness absence and number of grievances, are absent. Therefore, according to Leo, workplace bullying taking place in the PMO cannot be proved or substantiated.

9. Discussion

This study has explored workplace bullying in a para-military organisation in depth. The findings revealed different views to bullying within the PMO. For those that reported to have been bullied, they are of the opinion that the management of PMO are aware of the social problem. However, due to the fact that some of the alleged bullies are those within the position of power and authority, the management of PMO are not taking appropriate measures to

tackle the problem. For this group of bullied employees, the bullying cannot stop unless the bullies are expelled out of the organisation. That is, as long as they are still in the organisation, the bullying will not stop. This accounts point to the authoritarian management style, which according to Hoel and Cooper (2003) could be conducive for bullying to grow.

The key informants not accepting that bullying is going in the organisation should not be treated as the true picture of what is going in the PMO, especially when organisations similar to PMO have been identified by researchers such as Archer (1999) and McIvor (2006) as prone to workplace bullying. The evidence put forward by some of the interviewed employees identified the fear of been further victimised or labelled trouble maker, lack of trust in management of the organisation and individual's self help in dealing with their experiences of bullying. The effects of bullying on the physical and psychological well-being of the recipients reported in this study confirm what the existing literature has identified (see Sheehan, 2006). However, individual accounts of these effects show that people are affected by their experiences differently. Some of them suffered physical symptoms, while others suffered emotionally and experienced feelings such as anger, fear and depression. The accounts of those who suffered many physical symptoms can be linked with the duration or severity of their exposure to such behaviours. The longer the exposure to bullying behaviours, the more severe the effects can be on the recipient. However, workplace bulling can be a one off experience, which according to Hoel and Cooper (2003) can have a long-lasting effect on the recipient (Hoel & Cooper, 2003).

This study also revealed deliberate sabotage as one of the effects of workplace bullying. Even though some studies have identified deliberate sabotage as one of the effects of bullying on the organisation (see Sheehan, 2006; Lewis, 2006), there is still a gap in the existing literature on whether or not sabotage is one of the coping mechanisms the victims of bullying have devised to deal with their experiences of bullying. Some of the participants reported that they stopped talking and playing with their children. These reports reflect how workplace experiences can have a negative effect on the participant's lifestyles. Transferring aggression to loved ones at home in this situation is one of the coping mechanisms used by some of the participants. Although little research has been done on the effects of bullying on the family of victims, the present study has clearly shown that bullying can have a negative effect on the immediate family of those experiencing bullying. The implication of this finding is that the impact of bullying within the broader social system and in particular the families of those who have experienced bullying at work is an area for future research.

10. Implication of the Research

Most of the participants identified the bullies as the operational uniformed staff, especially as authority and recognition are attached to these operational staff. However, various explanations may be given for this finding, first, most of the people that took part in these interviews were uniformed staff and it is likely that they will work with other uniformed staff. If they are bullied, it will probably be perpetrated by the people with whom they work. Second, since there is a general misconception that the bullies are the uniformed staff, it is therefore probable that the behaviours perpetrated by the support staff might not be perceived as bullying, whereas if they were perpetrated by a member of the uniformed staff, they might then be interpreted as bullying. Third, the tolerance threshold of the support staff might be lower in comparison to that of the uniformed staff so the support staff might find some behaviour more offensive than do the uniformed staff. Tolerance levels in this situation can be said to be a factor of the type of induction, training, exposure and orientation the employee receive in the PMO. Such focus may affect the ability of employees to withstand stress, confrontation, direct control and sometimes being shouted at.

11. Conclusion

It may be concluded from this study that bullying is part of the culture of this organisation, and that may be why it is perceived to be accepted as a norm and is continuing. Individual counselling might be appropriate for the victims and assistance from specialist counsellors on how to deal with their experiences might also be very useful. Counselling may not only help people to get back to their normal lives, but also may help them to deal with any future workplace bullying. For the perpetrators, counselling and assistance is also required. Continuous counselling and training ought to be provided, because some bullies do not perceive themselves as bullies. In many situations the alleged bullies tend to justify their actions and blame it on the victims or other external factors such as the need to be firm and in control, or even organisational demands (Sheehan, 2006). Bullies in this situation may not be aware of what they are doing or how their behaviours may affect others. The intervention against such behaviours should be aimed at the victim(s), the perpetrator(s) and the management of the organisation. Putting in place intervention mechanisms, such as counselling, training on equality and diversity, and emphasising the effects of bullying on the employees and the organisation, may help to create a continuous awareness of this social phenomena. Furthermore, the management of the PMO should ensure that bullying cases are handled fairly, without giving preference to certain groups of staff within the organisation. All the policies and procedures aimed at ensuring that people work in

a safe environment should be implemented fairly and consistently, irrespective of the position or level of the parties involved.

12. Limitations and Areas of Future Research

The study revealed that the effects of bullying reported in most of the literature reviewed, such as absenteeism, reduced performance, increased labour turnover, job-dissatisfaction and increased sick leave, are not present in this organisation. Perhaps some of the negative effects of bullying reported in most of the literature needs to be further explored, so as to have a clearer knowledge of the effects of bullying on the organisation. Also carrying out this kind of research on another organisation might yield different results. This analysis is based on the information collected from seventeen people who reported to have been bullied and eight key informants within the PMO. This number of people is not large enough to be representative of the entire organisation. Therefore, the PMO is not representative of all UK workplaces, thus generalisability is limited. However, since making sense of the bullying experienced by people is dependent on the individual meaning and the interpretations they give to it, the findings cannot be treated as conclusive. However, the in-depth information collected from the main source (twenty-five interviewees) is considered to be suitable and consistent. Furthermore, this study was based on a policy of strict anonymity, it would be difficult to follow up those participants who have been bullied and are still experiencing the behaviours. Thus, one-to-one feedback, mediation or intervention measures might be a little difficult to provide.

References

Archer, D. (1999). Exploring 'Bullying' culture in para-military organisation, *International Journal of Manpower*, 20 (1-2), 94-105.

Atkinson, P. Coffey, A. and Delamont, S. (2003). *Key Themes in Qualitative Research, Continuities and Changes:* Rowman Altamira.

Branch, S. (2006). *Upward Bullying: An Exploratory Study of Power, Dependency and The Work Environment For Australia*. A Thesis for the degree of Doctor of Philosophy, Griffith Business School, Griffith University.

CIPD. (2007). Chartered Institute of Personnel and Management, April 2007.

Di Martino, V., Hoel, H. and Cooper, C. (2003). *Preventing Violence and Harassment in the workplace,* European Foundation for the improvement of living and working conditions. www.eurofound.eu.int .(Assessed 10 July 2007).

DTI (2007). The First Fair Treatment at Work Survey, *Employment Relations Research*, Series 63.

Einarsen, S. (2006). *The Way Forward by Looking Backwards*, Paper Presented at the Fifth International Conference on Workplace Bullying, Workplace Bullying- The way forward, Dublin.

Einarsen, S. and Hoel, H. (2001). *The Negative Acts Questionnaire: Development, Validation and Revision of a Measure of Bullying at Work*, Paper Presented at the 9th European Congress Work and Organisation Psychology, Prague, May.

Einarsen, S. and Mikkelson, G. (2003). Individual Effects of Exposure to Bullying at Work. In S.Einarsen, H. Hoel & C. L. Cooper (Eds), *Bullying and Emotional Abuse in the Workplace*: *International Perspective in Research and Practice*, London, Taylor and Francis.

Eriksen, W., and Einarsen, S. (2004).. Gender Minority As a Risk Factor of Exposure to Bullying at Work: The Case of Male Assistant Nurses. *European Journal of Work and Organizational Psychology,* 13 (4), pp. 473-492.

Ghauri, P. and Gronhaug, K. (2005). *Research Methods in Business Studies: A Practical Guide* (3rd edn)., Harlow, Financial Times Prentice Hall.

Giga, S., Hoel, H. and Lewis, D. (2008). *The Cost of Workplace Bullying*. A Research Commissioned by the Dignity at Work Partnership, May 2008.

Glaser, B. and Strauss, A. (1967). *The Discovery of Grounded Theory,* Chicago, IL, Aldine.

Hoel, H., Einarsen, S. and Cooper, C. (2003). Organisational Effects of Bullying. In S. Einarsen, H. Hoel, H., D. Zapf & C. Cooper, C (Eds*), Bullying and Emotional Abuse in the Workplace: International Perspectives in Research and Practice* (pp. 145-162).. London: Taylor and Francis

Lee, D. (2002). Gendered Workplace Bullying in the Restructured UK Civil Service *Personnel Review*, 31 (1-2), pp. 205-228.

Liefooghe, A. and Olafsson, R. (1999). Scientists and Amateurs: Mapping the Bullying Domain, *International Journal of Manpower*, (20). 1-2, pp. 39-49.

Lewis, D. and Gunn, R. (2006). Workplace Bullying in the Public Sector: Understanding the Racial Dimension*, Public Administration*, 85, (3), pp. 641-665.

Leymann, H. (1996). The Content and Development at Work, *European Journal of Work and Organizational Psychology*, 5 (2), pp. 165-184.

McCarthy, P., Henderson, M., Sheehan, M., and Barker, M. (2004/5). CSR and Employment Practices: Socially Responsible Investment as a Mechanism to Address Workplace Bullying, *New Academy Review*, 3(4), 73-95.

McCarthy, P., Sheehan, M., Wilkie, S, and Wilkie, W. (1998). *Bullying: Causes, Costs and Cures*, Beyond Bullying Association Inc., Brisbane.

Salin, D. (2004). *Organisational Measures Against Workplace Bullying: The View of Business Professionals*. Paper presented at the 4th International Conferences on Bullying and Harassment in the Workplace. 28-29 June, Bergen.

Saunders, M., Lewis, P. and Thornhill, A. (2007). *Research Methods for Business Students*, (4th Eds). FT Prentice Hall, Harlow.

Sheehan, M. (2006). *The Fight at Eureka Stockade: Down with the Tyrant an' Bully*, A paper presented at the Inaugural Professorial Lecture, Glamorgan Business School.

Tepper, B. (2000). Consequences of Abusive Supervision, *Academy of Management Journal*, 43, pp.178-190

Turney, L. (2003). Mental Health and Workplace bullying: The Role of Power, Professions and on The Job Training, *Australian e-Journal for the Advancement of Mental Health (AeJAMH).* 2(2). http://www.auseinet.com/journal/vol2iss2/turney.pdf (Assessed 15 March, 2007).

Vartia, M. (2001). Consequences of Workplace Bullying with Respect to the Well-being of its Targets and the Observers of Bullying, *Scandinavian Journal of Work and Environmental Health,* 5(2), pp. 215-237.

Vartia, M. and Hyyti, J. (2002). Gender Differences in Workplace Bullying Among Prison Officers, *European Journal of Work and Organizational Psychology,* 11(1), pp. 113 – 126.

Zapf, D. and Einarsen, S. (2003). Individual Antecedents of Bullying: Victims and Perpetrators. In Einarsen, S., Hoel, H., Zapf, D. and Cooper, C. (Eds), *Bullying and Emotional Abuse in the Workplace*, International perspectives in Research and Practice, (pp. 165-184)., London, Taylor and Francis.

Zapf, D., Einarsen, S., Hoel, H., and Vartia, M. (2003). Empirical Findings on Bullying in the Workplace. In S. Einarsen, H. Hoel, D. Zapf & C. Cooper (Eds.). *Bullying and emotional abuse in the workplace: International perspectives in research and practice*, (pp. 103-126), London: Taylor and Francis.

Table 1. Summary of the Research Findings

Themes	Sub-themes	Theoretical Background	Number of Responses
Causes of Bullying	Change	Lee (2000)	6
	Organisational Division	Lewis (2002)	9
	Power Relations	Eriksen & Einarsen (2004)	10
	Management	Sheehan (2006)	10
	Other Factors	Branch (2006)	3
Types of Bullying	Covert Bullying	Salin(2004),	8
	Overt Bullying	Vartia(2001)	9
	Upward Bullying	Hoel (2006)	1
Effects of Bullying	Personal Effects	Leymann (1996)	10
	Work and Organisational	Vartia (2001)	9
	No Effect	Salin (2006)	None
Actions taken	Did Something	Lee (2000)	17
	Did Nothing	Einarsen & Mikkelsen (2003)	8
		Zapf & Einarsen (2003)	
No Evidence of Bullying	Employees Resistance	Lee (2000)	3
	Lack of Evidence	Sheehan (2006)	8
	Pressure of Work		8

An Empirical Study on the Role of Interpersonal and Institutional Trust in Organizational Innovativeness

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Abstract

The main purpose of this paper is to explore the effects of the dimensions of organizational trust such as interpersonal trust (coworkers trust and trust in supervisors/leaders), and institutional trust on the dimensions of organizational innovativeness such as product, process, behavioral, and strategic innovativeness in beverages companies serving in Pakistan and Turkey, and banking companies operating in Pakistan. A quantitative research design was employed. Data were collected through survey instrument from 202 participants relating mainly from marketing, R&D and finance & accounting departments of beverages and banking companies. The results indicate that institutional trust is vital for both product and process innovativeness. Moreover, coworkers trust was positively associated to strategic innovativeness. Therefore, the results have confirmed the view of the prior researchers that the root of trust lies in individual relationships is not in opposition to the experience of trust both inside interpersonal relationships and as an institutional phenomenon beyond interpersonal relationships.

Keywords: Organizational Trust, Interpersonal Trust, Institutional Trust, Organizational Innovativeness

1. Introduction

Organizational researchers are of the view that "trust" remains the basis of high performance management team, and organizations seeking to enrich work, increase openness, risk taking, high levels of commitment, loyalty, and productivity (e.g. McGregor, D. 1967; Likert, R. 1967; Argyris, C. 1962; Ouchi, W.G.1981).Trust in the workplace whether it exists between co-workers, leaders and followers, employers and employees, between different organizations or towards an institution has been shown to have a strong and robust influence on a variety of organizational phenomena, including job satisfaction, organizational citizenship behaviors, organizational commitment, turnover, job, employee & team performance, innovative, workplace, and counterproductive behaviors, organizational revenue and profit (e.g. Dirks, 2000; Ferrin, 2001; Flaherty & Pappas, 2000; Frenkel, & Orlitzky, 2005; Tan and Tan, 2000; Simmons & Mclean, 2000; Colquitt et al., 2007)

Viewing the relationship between trust and innovativeness, researchers are of the view that trust can provide a sense of security, and can facilitate risk taking necessary for survival in contexts of high ambiguity, uncertainty and

complexity (Six, 2005). Where trust is lacking, people feel they have to examine and justify their actions. As a result, instead of finding and doing the right thing, developing exciting new ideas, taking risks and adding value, they spend their time working in an atmosphere of distrust. Thus trust is critical to the developing of ideas within a business organization. It is just as important in the realization practices that convert those ideas into new products, services and/or work practices (Dovey, 2009). In the same manner, Carolyn (2009) contends 'when we trust someone to do something, we let them get on with it. We don't waste time double-instructing and double-checking. When we're trusted, we don't waste time covering ourselves or playing politics, we feel free to innovate and experiment'. In sum, trust enables innovation to flourish – and mistrust stifles innovation and risk-taking.

However, the role of trust in promoting organizational innovativeness has so far attracted very little interest in academic research (Ellonen et al., 2008). Similarly, Maguire & Philips, 2008 provided that even though calls for a 'shift in research attention from trust in dyadic relations to trust in aggregate social systems (McEvily, Perrone, & Zaheer, 2003), but, the concept of institutional trust which creates a context conducive to more trusting interpersonal relationships and its difference from interpersonal trust have been studied very little in the organizational context (McKnight, Cummings,& Chervany, 1998; Rousseau et al., 1998). To fulfill this gap, although Ellonen et al.'s (2008) study has confirmed the major role of institutional trust as compared with interpersonal trust (coworkers trust and trust in supervisors/leaders) on different dimensions of organizational innovativeness such as product, process, behavioral, and strategic innovativeness. But main limitation of their study was that their survey sample was limited to information and communication technology and paper and pulp industries in Finland.

The main purpose of this paper is to explore the effects of the dimensions of organizational trust such as interpersonal trust (coworkers trust and trust in leaders/supervisors), and institutional trust on the dimensions of organizational innovativeness such as product, process, behavioral, and strategic innovativeness in beverages companies serving in Pakistan and Turkey, and banking companies operating in Pakistan. Our focus here is exclusively with trust within organizations i.e. as an intra-organizational phenomenon, such as between employees and supervisors/leaders or among co-workers where institutional trust is likely to be complementary and positively relate to that of interpersonal organizational trust (e.g. McKnight, Cummings ,& Chervany, 1998; Ellonen et al., 2008)

2. Theory and Hypotheses

2.1. Organizational Trust

Merriam-Webster on line dictionary has defined trust as an assured reliance on the character, ability, strength, or truth of someone or something Thus, according to this definition trust can be conceptualized in both forms i.e., personal and impersonal forms. Trust is conceptualized differently in various disciplines, including management, ethics, sociology, psychology, and economics as: 1) a behavioral intention or an internal action, similar to choosing, judging, or preferring, 2) synonymous with trustworthiness within the context of personal characteristics that inspire positive expectations on the part of other individuals, 3) a facet of personality that develops early in life and remains relatively stable through adulthood, and 4) a synonym for cooperation or risk taking (e.g. Rousseau et al., 1998; Colquitt et al., 2007).

Interpersonal trust, thus can be defined as a psychological state comprising the intention to accept vulnerability to the actions of another individual (a trustee), based upon the expectation that the other will perform a particular action that is important to the trustor (e.g. Mayer, Davis, & Schoorman, 1995; Lewis, & Weigert, 1985).

This trust literature distinguishes trustworthiness (the ability, benevolence, and integrity of a trustee) and trust propensity (a dispositional willingness to rely on others) from trust (the intention to accept vulnerability to a trustee based on positive expectations of his or her actions (Colquitt et al., 2007). This conception of interpersonal trust holds that a trustor will be willing to be vulnerable to another party based both on the trustor's propensity to trust other people in general, and on the trustor's perception that the particular trustee is trustworthy (Mayer, Davis, & Schoorman, 1995). Lewis and Weigert (1985) suggested that trust is based on "'good reasons' constituting evidence of trustworthiness".

Mayer et al. (1995) provided that trustworthiness is encompassed of three factors: ability, benevolence, and integrity. Ability is that group of skills, competencies, and characteristics that permit a party to have influence within some domain. Benevolence is the extent to which a trustee is believed to want to do good to the trustor, aside from an egocentric profit motive. Integrity is defined as the trustor's perception that the trustee adheres to a set of principles that the trustor finds acceptable. This trustworthiness dimensions reflect both cognition-based and affect-based sources of trust (McAllister, 1995): a cognitive calculation of the skills, capabilities, values, and principles of the trustee (in the forms of ability and integrity) may be supplemented by a more affective acknowledgment of the mutual concern inherent in the relationship (in the form of benevolence). The results of Colquitt et al.'s (2007)] meta

analytic study suggest that trustworthiness may be important even aside from their trust-fostering role i.e., ability, benevolence, and integrity had significant, unique relationships with behavioral outcomes even when trust was considered simultaneously.

By following Ellonen et al. (2008), in this paper we define organizational trust as the positive expectations individuals have about the competence, reliability and benevolence of organizational members, as well as the institutional trust within the organization (e.g. Mayer et al., 1995; McKnight, Cummings,& Chervany, 1998). Thus, in an organization, trust is a multidimensional variable i.e. an employee may trust his coworkers but distrust his supervisor or top management. Fox (1974) differentiated this as lateral or vertical trust; the former refers to trust relations among peers or equals who share a similar work situation, whereas the latter refers to trust relations between individuals and either their immediate supervisor, top management or the organizations as a whole (cited in McCauley & Kuhnert, 1992).

The present study will center on trust between coworkers, followers and supervisors, and towards an institution. This institutional trust is called as impersonal trust which does not refer to degrees of trust or distrust that are embodied in personal attitudes between individuals, however, the ability of top management to develop relationships with employees, beyond those with whom they interact frequently, is seen as limited. Thus, top management is regarded as group of persons at or near the top of the organizational chart is seen as deriving from the roles, rules, and structured relations of the organization and through influencing the organization's culture, the role of top management involves the creation and management of a system conducive to trust (McKnight et al.,2002).

McKnight et al. (1998) defined this institution based trust as "the belief that proper impersonal structures are in place to enable one to anticipate a successful future endeavor" such as: 1) structural assurance in shape of safeguards as regulations, guarantees, or contracts are in place to promote success, and 2) situation normality i.e., environment is in proper order and success is likely because situation is normal or favorable within the attributes of competence, benevolence, and integrity of management or organization to promote success..

According to Ellonen et al. (2008), this institutional trust could be characterized as the trust of its members in the organization's vision and strategy, its technological and commercial competence, its fair processes and structures, as well as its HR policies, and this impersonal trust is based on the roles, systems and reputations from which inferences are drawn about the trustworthiness of an individual, and its success is determined by the efficiency and the fairness of the organization-wide systems, such as the HR policies (Costigan et al., 1998).

2.2. Organizational Innovativeness

Dasgupta & Gupta (2009) argue:

As global competition intensifies and product life cycle shortens, the pressure to innovate heightens. Achieving low cost coupled with high quality are just the qualifying criteria and might not be the winning criteria. Critical to growth in most sectors is the combination of launching new products and services, entering lucrative markets, creating new competitive advantages, and deploying new business models. Sustainable development cannot happen without innovation. The challenge before every organization is to develop innovation strategies that not only respond to changes in the environment and societal pressures but also consider the needs and expectations of various stakeholders.

Prior research put the innovativeness as the development and/or use of new ideas or behaviors can pertain to a new product, service, market, operational and administrative structures, processes and systems (Damanpour et al., 2009). Soo et al. (2002) defined innovation as ' a mixture of process and product outputs that include new or modified products and services, patents, new marketing techniques, new managerial tools and administrative processes, licenses and wider thought leadership represented by things like presentations at conferences and publications' (cited in Dasgupta & Gupta, 2009). Researchers regard people are champions and change agents who bring about change by interacting with each other and by networking within and across organizations (Dasgupta & Gupta, 2009).

For this study, we have used the dimensions of organizational innovativeness as put by Wang and Ahmed (2004) and also used by Ellenen et al. (2008) in shape of Product, market, process, behavioral and strategic innovativeness: 1) Product innovativeness has been put as "the novelty and meaningfulness of new products introduced at the market at a timely fashion". 2) Market innovativeness is defined as "the newness of approaches that companies adopt to enter and exploit the targeted market". 3) Process innovativeness conceptualized as "the introduction of new production methods, new management approaches and new technology that can be used to improve production and management processes". 4) Behavioral innovativeness has been demonstrated through individuals, teams and management enables the formation of an innovative culture, the overall internal receptivity to new ideas and innovation". Finally, 5) Strategic innovativeness is defined as "an organization's ability to manage ambitious

organizational objectives, and identify a mismatch of these ambitions and existing resources in order to stretch or leverage limited resources creatively".

Innovation or innovativeness is thus 'production or adoption, assimilation, and exploitation of a value-added novelty in economic and social spheres; renewal and enlargement of products, services, and markets; development of new methods of production; and establishment of new management systems. Therefore, it is both a process and an outcome (Crossan & Apaydin, 2009)

2.3. Linkage of Organizational Trust with Organizational Innovativeness

Lee's (2004) study shows that trust within employees has positive effect on continuous improvement showing by employees through recognition of and perceived responsibility for quality and participation in activities aimed at improving quality are often seen as critical in enhancing companies' competitiveness. Hsien Niu's (2010) recent study found that interorganizational trust has positive effect on knowledge acquisition and creation that is considered an effective way for firms to remain competitive in turbulent environments and for improving the long-term innovativeness of an organization. Again within the context of projects, Maurer (2009) empirically found that trust between project team members working on an inter-organizational project positively impacts the acquisition of external knowledge which, in turn, promotes product innovation. In the same sense, Sarah et al.'s (2009) study shows the importance of trustworthiness of top management team members is vital for knowledge sharing. Garcia (2008) found that trust promotes inter functional integration between different departments e.g., R&D and marketing in shape of helping each other, tried to achieve goals jointly, shared ideas, information and resources, and took the project's technical and operative decisions together that in turn promotes internal success in shape of cost product and time goals and external success in shape of market performance. Clegg et al. (2002) study found that trust is implicated in the innovation process as a main effect and trust that benefit' is associated with the suggestion of ideas, whereas 'trust that heard' is associated with their implementation. Finally, trust in supervisor has positive effect on subordinate's innovative Behavior (Tan and Tan, 2000). All these studies have statistically significant results (p < .05) with positive Pearson's correlation coefficient (r) ranging from .20 to .83 as shown in table 1. Although contexts of these studies vary from continuous improvement, knowledge acquisition, creation & sharing, and ideas suggested and implementation to functional integration and innovation behavior, however, it convey the message that high levels of trust have a positive effect on the effectiveness and quality of organizational knowledge sharing and Innovation (Ellonen et al.,2008). Thus, the literature exposed above would lead us to formulate the following hypothesis:

H1: Coworkers trust is positively related to organizational innovativeness.

H2: Employees trust in their immediate supervisors is positively related to organizational   innovativeness.

Moreover, in Ellenon et al.'s (2008) study imply that the impersonal form in particular, namely institutional trust, has an important role in determining organizational innovativeness. So we further propose that:

H3: Institutional trust is positively related to organizational innovativeness.

3. Data Collection & Measurement Scales

For data collection, we have used 65 survey questions along with demographics questions consisted multi-item measures representing to interpersonal trust, institutional trust, and organizational innovativeness constructs: coworkers trust and trust on supervisors constructs have 15 item each; institutional trust has 19 item; and organizational innovativeness construct has 16 items validated and shown to be reliable in previous research (Ellonen et al., 2008). These multi-items measures after slight modifications were adapted by Ellonen et al. (2008). Factor solutions and reliability of this multi-items measures in Ellonen et al.'s (2008) study found that each construct has distinct dimensions: 1) coworkers trust construct has three dimensions of trust in employee reliability (six items, alpha 0.894); trust in employee competence (five items, alpha 0.846); and trust in employee benevolence (four items, alpha 0.859), 2) trust in supervisors construct has three dimensions of trust in the leaders' reliability (six items, alpha 0.920); trust in the leaders' competence (five items, alpha 0.935); and trust in the leaders' benevolence (four items, alpha 0.896), 3) institutional trust construct has four dimensions of situational normality: benevolence and reliability (six items, alpha 0.857); vision, strategy and communication (six items, alpha 0.856); situational normality: competence (four items, alpha 0.804); and structural assurance (two items, alpha 0.665) but finally by arguing that institutional trust was considered one-dimensional construct, Ellonen et al. (2008) developed the final scale by computing the average of all 19 items (alpha 0.918), and 4) organizational innovativeness construct has four dimensions of product innovativeness (five items, alpha 0.833); behavioral innovativeness (five items, alpha 0.825); strategic innovativeness (three items, alpha 0.712); and process innovativeness (three items, alpha 0.557). These constructs presented as statements that respondents show their agreement with on a five-point likert scale of

1=strongly disagree to 5=strongly agree.

This survey was applied to employees working in marketing, production, R&D, and accounting & finance departments of production & distribution units of two multinational beverages companies serving in Pakistan and Turkey and two main branches of two leading banks operating in Pakistan. By using paper format of English version of the survey questionnaire, data were collected by the correspondence author by visiting respondents during July and August, 2009 from Pakistan. For data collection from Turkey, this questionnaire survey was translated in Turkish Language by the experts from Faculty of Business Administration, Istanbul University and through the contact person data collected during November and December, 2009. The survey questionnaire was distributed randomly to the respondents as follows: 90 to banking employees of two branches, 190 to beverages companies' employees of Pakistan, and 80 to beverage company's employees relating to sales & marketing of Turkey. Most of the respondents were male (97%) representing lower and middle management (65%) of marketing (45%), accounting and finance (29%), and production & R&D (22%). The final response rate was 64% (360 questionnaires sent out of which 232were returned). In total there were 30 deficient responses that did not properly filled; they have been not included in the analysis. Therefore effective response rate was 56% (202/360) which is good in this type of study.

For current study with the help of SPSS, principal component analysis and varimax-rotated factor loadings of coworkers trust, and trust on supervisors/leaders have been presented in Tables 2 and 3. Table 2 shows three factor solution of coworkers trust (one item has been excluded out of 15 item due to low loading) in shape of trust in employees' competency (5 item), integrity (5 item), and benevolence (4 item) explained 61% of total variance. Moreover, last item of table two was treated as integrity item in Ellonen et al.'s (2008) study, where as in this study, it has been perceived as benevolence item. These three factors of coworkers trust have acceptable cronbach's alpha (see table 6) i.e. employees' competency (a=0.827), employees' integrity (a= 0.792), and employees' benevolence (a= 0.814). Table 3 has provided two factor solution of employees' trust on supervisors/leaders: 1) two dimensions of employees trust on supervisors/leaders such as trust in leaders' integrity and benevolence (confirmed the Colquitt et al.'s 2007 contention that some conceptualizations of trustworthiness combine benevolence and integrity into a single character variable) having 5 item each have been loaded within single factor, 2) where as second factor has loaded the dimension of competence (5items) explained 59.8% of total variance. These two factor of employees' trust on supervisors/leaders have acceptable cronbach's alpha (see table 6) i.e. trust in leaders' integrity and benevolence (a=0.909), and trust in leaders' competency (a= 0.872). Both of these constructs of interpersonal trust (coworkers trust and employees trust on their supervisors/leaders) having acceptable measure of sampling adequacy in shape Kaiser-Meyer-Olkin (KMO) such as 0.890 and 0.895 respectively.

Although current study also by following the Ellonen et al. (2008) developed the final scale of institutional trust by computing the average of all 19 item with crobach's alpha (a= 0.909) ; however, as practiced by prior research (McKnight et al., 2002), to keep this scale to be restricted to situational normality and structural assurance items, by excluding 5 items out of 19 items relating to vision, strategy, management expertise, in table 4, we produce two factor solution of the institutional construct: 1) two dimensions of situational normality such as integrity and benevolence (7 item), and 2) one dimension of situational normality such as competence (4 item); and structural assurance construct (2items) having acceptable crobach's alpha i.e., 0.888 & 0.867 respectively, and together explained 58.8% of total variance with acceptable KMO (0.919).

Finally, Organizational innovativeness was measured on 16 item scale having four dimensions of product (5 item); behavioral (5 item), strategic (3 item); and process innovation (3item) was adapted by Ellonen et al. (2008) from Wang and Ahmed's (2004) study. Wang and Ahmed (2004) classified the items into five factors in accordance with the following dimensions: product; market; process; behavioral; and strategic innovativeness. The present study confirmed Ellonen et al.'s (2008) four factor solutions of organizational innovativeness scale with acceptable KMO (.899) explained 67.2% of total variance. These four dimensions organizational innovativeness construct have acceptable cronbach's alpha (see table 6) i.e. product innovativeness (a=0.863), behavioral innovativeness (a= 0.831), strategic innovativeness (a= 0.813), and process innovativeness (a= 0.770).

4. Results

4.1. Correlation Analysis

As indicated in the theoretical discussion that we looked for relationships between the dimensions of organizational trust in shape of coworkers trust, employees' trust on supervisors/leaders, and institutional trust with the dimensions of organizational innovativeness such as product, process, behavioral and strategic innovativeness; table 6 shows the means, standard deviations and Cronbach's alphas of the variables, and provides a correlation matrix. As the matrix shows that every dimensions of interpersonal and institutional trust has statistically significant correlation

(**correlation is significant at the 0.01) with every dimensions of organizational innovativeness. Therefore, this strong correlation between the variables confirm our all the hypotheses. However, the strong positive correlation between trust in coworkers' competency and supervisors' competency that is equal to one that could lead problems of multicollinearity during regression analysis (Ellonen et al., 2008).

4.2. Regression Analysis

To analyze the effects of six dimensions of organizational trust on the four dimensions of organizational innovativeness, with the help of SPSS, we carried out multivariate linear regression as shown in Table 7. Regression models in table 7 confirm that the role of institutional trust in organizational innovativeness seems to be the most important. In addition, interpersonal trust is related to organizational innovativeness, although not all dimensions are positively associated. There is a clear negative relationship between trust in coworkers' integrity, trust in supervisors'' integrity & benevolence, and product innovativeness that show the strong multicollinearity in the variables. To confirm, this multicollinearity, regression analysis exclude the 'trust in supervisors competency' by giving the collinearity statistics in shape of 1) tolerance is equal to 0.000 which is less than common cut-off threshold of 0.1, and 2) the condition index is 34.978 which should generally be 30 or less (2008). Therefore, by following Ellonen et al. (2008), alternatively, we attempted to correct for multicollinearity by re-specifying the model so that the original six dimensions of organizational trust were replaced by three components such as coworkers trust, trust on supervisors and institutional trust. Now tolerance values ranges 0.209 to 0.361 which are above than 0.1 and VIF values ranges from 2.77 to 4.79 which are less than 10, but condition index values ranges from 14.386 and 22.978 to 31.492. The final index value is crossing the threshold of 30 slightly but as a whole multicollinearity should not affect the interpretation of the regression coefficients (Ellonen et al, 2008). The results are shown in Table 8. By analyzing the result of regression analysis in shape of Adj. R Square (R^2) of each model shown in table 8, we can conclude that organizational trust with its various dimensions explained 23.3 per cent of the variance in product innovativeness, 24.2 per cent of the variance in behavioral innovativeness, 17.9 per cent of the variance in strategic innovativeness, and 29.54 percent of the variance in process innovativeness. Moreover, the models' respective F values are significant at $P<.05$. Therefore, our base line hypotheses: 1) coworkers trust is positively related to organizational innovativeness, 2) employees trust in their immediate supervisors is positively related to organizational innovativeness, and 3) institutional trust is positively related to organizational innovativeness all are supported. All dimensions of organizational trust are positively related to all the dimensions of organizational innovativeness. However, institutional trust is significantly related to both dimensions of product and process innovativeness, whereas coworkers trust is significantly related to strategic innovativeness.

5. Discussion and Conclusion

By following the Ellonen et al. (2008), in this study, we have analyzed the effects of both interpersonal and institutional organizational trust on various dimensions of organizational innovativeness. We found the effect of institutional trust to be stronger than that of other types of interpersonal trust in determining the organization's innovativeness. We also found that organizational trust explained a larger proportion of the variance in the process innovativeness (29.9%), followed by behavioral, product and strategic innovativeness (24.2%, 23.3%, and 17.9%). As compared with interpersonal trust dimension, the dimension of institutional trust significantly account for significant variance (36.6%) in product innovativeness, and (34.4%) in process innovativeness. This implied that for process innovation & product innovation to occur, impersonal trust will be relied on more in virtual structures facilitated by technological rather than interactional interfaces (Atkinson & Butcher, 2003) with the aim to increase efficiency and effectiveness of the internal organizational processes (technological process innovation, administrative process innovations), and multidisciplinary process to facilitate the production and delivery of new goods or services to the customers (Damanpour et al.,2009). On the other hand, as compared with institutional trust, coworkers trust dimension of interpersonal trust account for significant variance (29.5%) in strategic innovativeness i.e., an organization's ability to manage ambitious organizational objectives, and identify a mismatch of these ambitions and existing resources in order to stretch or leverage limited resources dynamically. To leverage the limited resources in shape of human capital innovatively, Ferres et al. (2004) found that co-worker trust was found to be a significant predictor of lowered turnover intention. Recognizing this, SAS CEO Dr. James Goodnight noted that 'when 95 percent of a company's assets drive out the front gate every night, the CEO must see to it that they return the following day'. A trust-based environment is among others measures to help get people to return (Kochan et al, 2003. It implies that if the organizational environment encourages a high level of management trust in employees, employees, in turn, will reciprocate high levels of trust towards management that in our perception boost an organizational competitiveness (McCauley & Kuhnert, 1992). The research results have confirmed the view of prior researchers (e.g. McCauley & Kuhnert, 1992; Luhmann,1979; Costigan et al., 1998; McKnight et al., 1998; McKnight et al., 2002; Atkinson and Butcher, 2003) that the root of trust lies in individual relationships is not in

opposition to the experience of trust both inside interpersonal relationships and as an institutional phenomenon beyond interpersonal relationships.

The present study provides linkages between the dimensions of organizational trust and organizational innovativeness that have previously been studied very little. Moreover, it contributes theoretically and practically by concluding that in order to increase the organizational innovation within today's dynamic organizations, it is important to realize the dual nature of trust i.e. personal and impersonal forms of trust. Importantly, given the importance of institutional trust to organizational innovativeness such as product and process innovativeness, our research results can provide a guide for increasing the importance of institutional trust in shape of the trust of its members in the organization's vision and strategy, its technological and commercial competence, its fair processes and structures, as well as its HR policies, and this impersonal trust is based on the roles, systems and reputations from which inferences are drawn about the trustworthiness of an individual, and its success is determined by the efficiency and the fairness of the organization-wide systems, such as the HR policies.

The sample representing Turkish respondents was small as compared with sample representing Pakistani respondents, so large sample is required to generalize the results fully in Turkey, so our future study will focus to fill this gap. Moreover, as suggested by Ellonen et al. (2008), a full-scale development and validation for institutional trust construct is required.

References

McGregor, D. (1967). *The professional manager.* New York: McGraw-Hill.

Likert, R. (1967). *The human organization.* New York: McGraw-Hill.

Argyris, C. (1962). *Interpersonal competence and organizational effectiveness.* Homewood, IL: Dorsey.

Ouchi, W.G. (1981). Theory Z: How American business can meet the Japanese challenge. Reading, MA: Addison-Wesley.

Dirks, K. T. & Ferrin, D. L. (2001). The role of trust in organizational settings. *Organization Science*, 12,450-467

Flaherty, K. E., & Pappas, J. M. (2000). The role of trust in salesperson-sales manager relationships. *Journal of Personal Selling and Sales Management*, 20, 271-278.

Frenkel, S. & Orlitzky, M. (2005). Organizational trustworthiness and workplace labor productivity: Testing a new theory. Asia pacific journal of Human Resources, 43, 34-51.

Tan, H.H. and Tan, C.S.F. (2000). Toward a differentiation of trust in supervisor and trust in organization. Genetic, *Social and General Psychology Monographs*, 126, 2, 241-60.

Simons, T. & McLean, P. J. (2002). Empty words: The impact of perceived managerial integrity on employees, customers and profits. Paper presented at the annual meeting of the Academy of Management, Denver, CO.

Colquitt, J.A., Scott, B.A. & LePine, J.A. (2007). Trust, trustworthiness, and trust propensity: A meta-analytic test of their unique relationships with risk taking and job performance. *Journal of Applied Psychology*, 92, 909–927.

Six, F. (2005). The Trouble with Trust: The Dynamics of Interpersonal Trust Building. Edward Elgar Cheltenham, UK.

Dovey, K. (2009). The role of trust in innovation. *The Learning Organization*, 16, 4, 311-325.

Carolyn, L. (2009). Driving productivity, engagement and innovation by building trust. *Human Resources Magazin*e, 13,5, 24-26.

Ellonen, R., Blomqvist, K. & Puumalainen, K. (2008). The role of trust in organizational innovativeness. European *Journal of Innovation Management*, 11, 2, 160-181

Maguire, S. & Phillips, N. (2008). Citibankers' at Citigroup: A Study of the Loss of Institutional Trust after a Merger. *Journal of Management Studie*s, 45, 2. 372-401.

McEvily, B., Perrone, V. and Zaheer, A. (2003a). Trust as an organizing principle, *Organization Science*, 14, 91–103.

McKnight, D.H., Cummings, L.I. & Chervany, N.I. (1998). Initial trust formation in new organizational relationships. *Academy of Management Review*, 23, 3, 473-90.

Rousseau, D., Sitkin, S., Burt, R. & Camerer, C. (1998). Not so different after all: A cross-discipline view of trust. Academy of Management Review, 23, 387-392.

Mayer, R. C., Davis, J. H., & Schoorman, F. D. (1995). An integrative model of organizational trust. *Academy of Management Review*, 20, 709–734.

Lewis, D. J. & Weigert, A. (1985). Trust as a social reality. *Social Forces*, 64, 967-985.

McAllister, D. J. (1995). Affect- and cognition-based trust as foundations for interpersonal cooperation in organizations. *Academy of Management Journal*, 38: 24-59.

Fox, A. (1974). Beyond contract: Work, Power, and Trust Relations. London: Faber and Faber.

McCauley, D.P. & Kuhnert, K.W. (1992). A theoretical review and empirical investigation of employee trust in management. *Public Administration Quarterly*, 16, 2, 265-85.

McKnight, D.H., Choudbury, V. & Kacmar, C. (2002). Developing and validating trust measures for e-commerce: an integrative typology. *Information Systems Research*, 13, 3, 334-61.

Costigan, R.D., Ilter, S.E. & Berman, J.J. (1998). A multi-dimensional study of trust in Organizations. *Journal of Managerial Issues*, X, 3, 303-17.

Dasgupta, M. & Gupta, R.K. (2009). Innovation in Organizations: A Review of the Role of Organizational Learning and Knowledge Management. *Global Business Review*, 10, 203 – 224.

Damanpour, Fariborz; Walker, Richard M; Avellaneda, Claudia N. (2009). Combinative Effects of Innovation Types and Organizational Performance. *Journal of Management Studies*,46, 4, 650-675.

Soo, C., T. Devinney, D. Midgley & A. Deering (2002). Knowledge Management: Philosophy, Processes and Pitfalls. *California Management Review*, 44(4).

Wang, C.L. & Ahmed, P.K. (2004). The development and validation of the organizational innovativeness construct using confirmatory factor analysis. *European Journal of Innovation Management*, 7, 4, 303-13.

Crossan, M.M. & Apaydin, M. (2009). A multi-dimensional framework of organizational innovation. *Journal of Management Studies,* 47,6, 1155-1191.

Lee, H. j. (2004). The role of competence-based trust and organizational identification in continuous improvement. *Journal of Managerial Psychology,* 19, 6, 623-639.

Hsien Niu, K. (2010). Organizational trust and knowledge obtaining in industrial clusters. *Journal of Knowledge Management*, 14, 1 2010, 141-155

Maurer, I. (2009). How to build trust in inter-organizational projects: The impact of project staffing and project rewards on the formation of trust, knowledge acquisition and product innovation. International Journal of Project Management, (In Press doi:10.1016/j.ijproman.2009.11.006).

Sarah, M., Flood, P.C. & Ramamoorty, N. (2009). The top team, trust, reflexivity, knowledge. *Academy of Management Proceedings 2009*.

Garcia, N., Sanzo, J. and Trespalacios, A. (2008). New product internal performance and market performance: Evidence from Spanish firms regarding the role of trust, interfunctional integration, and innovation type. Technovation,28,11, p.713-725.

Clegg, C., Unsworth, K., Epitropaki, O. & Parker, G. (2002). Implicating trust in the innovation process. *Journal of Occupational and Organizational Psychology,* 75, 409-422.

Atkinson, S. & Butcher, D. (2003). Trust in managerial relationships. *Journal of Managerial Psychology*,18, 4, 282-304

Ferres, N., Connell, J. & Travaglione, A. (2004). Co-worker trust as social catalyst for constructive employee attitudes. *Journal of Managerial Psychology*,19, 6, 608-622.

Kochan, T. A., Orlikowski, W. & Gershenfeld, J.C. (2003). Beyond McGregor's Theory Y: Human Capital and Knowledge-Based Work in the Twenty-First-Century Organization. In Kochan, T. A. & Schmalensee, R. L (eds). Management: inventing and delivering its future MIT Sloan School of Management: 50th anniversary, 85-113.

Luhmann, N. (1979). *Trust and Power*. Wiley, Chichester.

Table 1. Research Examining Effects of Organizational Trust on Organizational Innovativeness

Study	Examining Organizational Trust with Organizational Innovativeness	sig	r
Lee (2004)	Trust within employees has (+) effect on continuous improvement	p	.43
Hsien Niu (2010)	Trust among firms has (+) effect on knowledge acquisition & creation	p	.32to.61
Maurer (2009)	Trust between project team members has (+) effect on Knowledge acquisition, which in turn impact product innovation	ns	.41
Sarah et al. (2009	Trustworthiness within Top Management Team members has (+) effect on knowledge sharing	p	.83
Garcia et al. (2008)	Trust within R&D Managers of innovative firms has (+) effect on Inter functional integration	p	n/a
Clegg et al. (2002)	Trust within design engineers has (+) effect on ideas suggested and implementation	ps	.20to.47
Jong &Thuis (2008)	Interorganizational trust has (+) effect on the performance of high-tech alliances in terms of relational satisfaction	p	.57
Tan & Tan (2000)	Trust in supervisor has (+) effect on subordinate's innovative behavior	p	.69
Lavado et al.(2009)	Social capital has (+) effect on product innovation.	p	.23
Ellonen et al. 2008)	Institutional trust has (+) effect on organizational innovativeness.	p	.37to 53

Notes: Sig = statistically significant finding ($p < .05$); ns = non-significant effect; p = positive, significant effect; n/a = data not available; ps= partially significant; (+) = positive;   r (Pearson correlation coefficient).

Table 2. Factor Analysis of Coworkers Trust

Coworker Trust Items	Factor 1	2	3
I feel very confident about the skills of the employees of the unit	0.812		
I believe that most employees in this organizational unit do a very good job at their work	0.765		
A large majority of the employees of this organizational unit are competent in their area of expertise	0.732		
The employees in this organizational unit have much knowledge on the work that needs to be done	0.594		
The employees in this organizational unit are known to be successful in what they do	0.592		
The employees in this organizational unit try hard to be fair in dealings with others		0.769	
The actions and behavior of the employees in this organizational unit are always consistent		0.727	
Integrity is a key value in the operations of the employees of this organizational unit		0.615	
The employees in this organizational unit have a strong sense of justice		0.607	
In general, most employees in this organizational unit keep their promises		0.569	
My needs and desires are important to the employees of this organizational unit			0.874
A typical employee in this organizational unit is sincerely concerned with the problems of others			0.773
The employees in this organizational unit are concerned with my welfare			0.676
The employees in this organizational unit communicate openly about things that are important to me			0.548
Cumulative percentage of the variance explained (%)	22.2	41.6	61.0

Table 3. Factor Analysis of Employees' Trust on Supervisor/Leaders

Trust in Supervisors items	Factor 1	2
My needs and desires are important to the leaders of this organizational unit	0.805	
A typical leader in this organizational unit is sincerely concerned with the problems of others	0.762	
The leaders in this organizational unit are concerned with my welfare	0.747	
The actions and behavior of the leaders in this organizational unit are always consistent	0.707	
Most of the times, the leaders try to be helpful rather that just look out for themselves	0.624	
The leaders in this organizational unit communicate openly about things that are important to me.	0.621	
The leaders in this organizational unit try hard to be fair in dealings with others	0.592	
Integrity is a key value in the operations of the leaders of this organizational unit	0.566	
The leaders in this organizational unit have a strong sense of justice	0.536	
In general, most leaders in this organizational unit keep their promises	0.534	
The leaders in this organizational unit have much knowledge on the work that needs to be done		0.791
I believe that most leaders in this organizational unit do a very good job at their work		0.786
The leaders in this organizational unit are known to be successful in what they do		0.742
A large majority of the leaders of this organizational unit are competent in their area of expertise		0.739
I feel very confident about the skills of the leaders of the unit		0.718
Cumulative percentage of the variance explained (%)	31.1	59.8

Table 4. Factor Analysis of Institutional Trust

Institutional Trust Items	Factor 1	2
The management of this organizational unit is concerned with its employees' welfare and future	0.785	
The management of this organizational unit communicates openly of things that are important to me	0.769	
I feel comfortable to rely on this organizational unit to meet its obligations	0.716	
The actions and words of the management of this organizational unit are in line	0.710	
This organizational unit thinks not only about its own advantage but also about what is important to the whole company	0.685	
I feel fine working in this organizational unit, since it generally fulfills its agreements	0.677	
In my opinion, this organizational unit regards other people equally and respectfully	0.643	
Our data systems support our operations well		0.769
I believe that the processes of this unit are of good quality		0.734
Our HR practices support our operations well		0.713
I trust this organizational unit's capability to develop and learn continuously		0.688
Internal communication in this organizational unit works efficiently		0.674
I believe that this unit is technologically competent		0.649
I believe that this organizational unit is commercially competent		0.613
Cumulative percentage of the variance explained (%)	29.7	58.8

Table 5. Factor Analysis of Organizational Innovativeness

Organizational Innovativeness Items	Factor			
	1	2	3	4
The new products and services of this organizational unit are often perceived as very novel and innovative by customers	0.790			
In new product and service introductions, this organizational unit is often first-to-market	0.786			
The new products and services of this organizational unit often beat new competitors	0.711			
During the past five years, this organizational unit has introduced more innovative products and services than its competitors	0.633			
In new product and service introduction, this organizational unit is often at the cutting edge of technology	0.574			
One gets a lot of support from managers if one wants to try new ways of doing things		0.760		
In this organizational unit, people are encouraged to think and behave in original and novel ways		0.717		
Individuals who do things in a different way are accepted and tolerated in this uni		0.704		
In this organizational unit, people are willing to try new ways of doing things and seek unusual, novel solutions		0.645		
When a problem cannot be solved using conventional methods, people in this Organizational unit invent new methods		0.611		
The managers of this organizational unit constantly seek unusual, novel solutions to problems through "idea men"			0.829	
The managers of this organizational unit are willing to take risks to seize and explore "chancy" growth opportunities			0.771	
In comparison with its competitors, this organizational unit's most recent product Marketing program is revolutionary in the market			0.646	
This organizational unit improves its business processes constantly				0.807
During the past five years, this organizational unit has developed many new management approaches				0.709
This organizational unit changes the production methods faster than its competitors				0.660
Cumulative percentage of the variance explained (%)	19.9	38.8	53.0	67.2

Table 6. Variable & Correlation Matrix

Variable	M	S.D.	a	1	2	3	4	5	6	7	8	9	10
P.I.	3.84	0.726	0.863	1	-	-	-	-	-	-	-	-	-
B.I.	3.67	0.689	0.831	0.637**	1	-	-	-	-	-	-	-	-
S.I.	3.61	0.761	0.813	0.601**	0.606**	1	-	-	-	-	-	-	-
Ps.I.	3.80	0.733	0.770	0.638**	0.580**	0.546**	1	-	-	-	-	-	-
T.C.C.	3.86	0.660	0.827	0.428**	0.343**	0.3 20**	0.474**	1	-	-	-	-	-
T.C. I.	3.69	0.706	0.792	0.309**	0.345**	0.348**	0.341**	0.611**	1	-	-	-	-
T.C. B.	3.52	0.824	0.814	0.359**	0.465**	0.425**	0.397**	0.569**	0.610**	1	-	-	-
T.S.I.B.	3.58	0.715	0.909	0.403**	0.473**	0.424**	0.476**	0.650**	0.651**	0.688**	1	-	-
T.S.C.	3.86	0.660	0.872	0.428**	0.343**	0.320**	0.474**	1.000**	0.611**	0.569**	0.650**	1	-
I. T.	3.75	0.631	0.909	0.483**	0.471**	0.373**	0.542**	0.702**	0.582**	0.601**	0.823**	0.702**	1

Note: **Correlation is significant at the 0.01 level (2-tailed); P.I. =Product Innovation; B.I. = Behavioral Innovation; S.I. = Strategic Innovation; Ps.I. = Process Innovation; T.C.C. = Trust in Coworkers' Competency; T.C.I. = Trust in Coworkers' Integrity; T.C.B. = Trust in Coworkers' Benevolence; T.S.I.B. = Trust in Supervisors' Integrity and Benevolence; T.S.C. = Trust in Supervisors' Competence; and I. T. = Institutional Trust.

Table 7. Multivariate Regression Analysis

Dimensions of innovativeness	*Dependent Variables*							
	Product Innovativeness		Behavioral Innovativeness		Strategic Innovativeness		Process Innovativeness	
Model fit	*Adj. R²*	*F*	*Adj. R²*	*F*	*Adj. R²*	*F*	*Adj. R²*	*F*
	0.234	13.213*	0.259	14.954*	0.195	10.715*	0.298	17.976*
Independent Variables	Beta	T	Beta	T	Beta	T	Beta	T
Trust in coworker competence	0.170	1.817	-0.059	-0.635	-0.002	-0.018	0.183	2.035
Trust in coworkers' integrity	-0.029	-0.329	0.005	0.060	0.057	0.628	-0.052	-0.613
Trust in coworker's benevolence	0.096	1.058	0.254	2.853	0.232	2.504	0.076	0.874
Trust in supervisors' integrity & benevolence	-0.060	-0.483	0.119	0.973	0.196	1.539	0.037	0.313
Institutional trust	0.371	3.133	0.260	2.227	0.039	0.323	0.367	3.238
Excluded variable: Trust in supervisors' competence: Collinearity Statistics: Tolerance (0.000), condition index (34.978)								

Note: * Significant at 0.05

Table 8. Multivariate Regression Analysis

Dimensions of innovativeness	*Dependent Variables*							
	Product Innovation		Behavioral Innovation		Strategic Innovation		Process Innovation	
Model fit	*Adj. R²*	*F*	*Adj. R²*	*F*	*Adj. R²*	*F*	*Adj. R²*	*F*
	0.233	21.329*	0.242	22.432*	0.179	15.574*	0.299	29.547*
Independent Variables	Beta	T	Beta	T	Beta	T	Beta	T
Institutional trust	0.366	3.018*	0.185	1.532	0.073	0.583	0.344	2.965*
Coworkers Trust	0.153	1.488	0.149	1.459	0.295	2.771*	0.109	1.110
Trust on supervisors	0.005	0.037	0.207	1.537	0.097	0.692	0.138	1.065

Note: * Significant at 0.05

Efficiency and Ranking Measurement of Vendors
by Data Envelopment Analysis

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Abstract

One of the key issues in logistics management context is the measurement of the vendors' efficiency which helps companies to achieve the most appropriate services. In today's competitive condition, most of the firms have changed from a single vendor to a multi-vendor point of view. A number of conceptual and analytical models have also been developed for identifying the vendor selection problems. It has been recognized that a lot of factors may influence the vendors' efficiency therefore a suitable approach is required to consider major factors in order to select the most efficient ones. This paper presents a practical approach for evaluating vendors which provide the required services in a procurement situation. This approach uses data envelopment analysis to evaluate the vendors' efficiency. Anderson and Peterson model is also applied to rank the efficient vendors. The criteria considered in this model are service quality, price, average of late deliveries and rate of rejected parts. A case study is implemented in a pipe manufacturing company to prove the mentioned methods. Findings pinpoint that the vendors which present better services are not necessarily the most efficient one. This research also provides an appropriate framework for organization to examine the vendors' efficiency and also choose some effective ways to improve vendors' performance.

Keywords: Data Envelopment Analysis, Vendor Selection, Service Quality, Efficiency, Ranking

1. Introduction

Vendor evaluation and selection is a critical subject in providing a suitable procurement situation. Recent studies have highlighted the necessity of vendors' evaluations. Based on the literature, supplier/vendor selection may be the most critical way in purchasing process. Therefore, purchasing departments should periodically evaluate their supplier/vendor performance in order to recognize the best supplier/vendor (Braglia and Petroni, 2000; Wu and

Blackhurst, 2009).

There must be an appropriate process to define the procurement requirement which support the company's business plan. The value of these requirements should be identified as well as price of vendors' products. The value of product quality, service levels and on time delivery are some of the factors which can be considered in the process of vendor's evaluation. This method can help the organization to evaluate its vendors and to recognize the most efficient ones (Hugos, 2003).

Vendor selection is the process which review, evaluate and ultimately select the best vendors. It is one of the most important decision making problems, because selecting the proper vendors may reduce the purchasing costs and improves competitiveness corporation situation. Different methodologies from simple weighted scoring models to advanced mathematical programming models have been used to solve this problem. Some of the multi-criteria, mathematical programming, and advanced methodologies which have been utilized for vendor selection problems are depicted in Table 1 (Talluri et al., 2006).

Appropriate vendors or suppliers selection is one of the fundamental strategies of organization to enhance the best quality of output which has a direct influence on the company's performance. The importance of vendor selection has been stated in the literature (Weber et al., 1991). Vendor selection decisions are also a crucial component of production and logistics management in many firms. These decisions are typically complicated due to the several reasons. First of all, potential options may require to be assessed on more than one criterion. Multi-criteria evaluation has been recognized to be particularly important in manufacturing strategies (Chapman, 1990). The second complication of vendor selection decisions is that individual vendors may have different performance characteristics based on the different criteria. For example, the vendor which can supply an item for the least per unit price may not have the best delivery, quality or performance in compare with other vendors. The third complication surrounding the vendor selection decision comes from internal policy limitations and externally imposed system constraints placed on the procurement process. Internal policy constraints exist either implicitly or explicitly in the purchasing process such as the number of vendors, minimum or maximum order quantities, the use of minority vendors, etc. Similarly, suppliers may impose some constraints in the buying process like their own minimum/maximum order quantities based on their production capacity or their willingness to be in contact with a particular firm. These constraints ultimately influence the number of vendors and the order quantities in procurement situation (Weber et al., 2000).

In this paper, service quality, price, average of late delivery times and rate of rejected parts are considered as one output and some inputs of data envelopment analysis (DEA) model, respectively. The Parasuraman model is also used to measure the vendors' service quality. Data are gathered through a checklist based on the five dimensions of the mentioned model and vendors' corporation tenure. The vendors' efficiency is measured through Russell model in DEA approach. Anderson and Peterson model is also applied to rank the efficient vendors. Finally, a case study is presented to prove the capability of proposed model. In this study, 12 vendors are examined based on the stated approach. Findings of this study pinpoint that the vendors which provide the best services are not necessarily efficient.

This paper is organized as follows. The relevant literature on the vendor/supplier area is reviewed. Then, service quality concept, applied data envelopment analysis approach are explained. In the following, a case study is proposed to examine the applicability of stated methodology. Finally, results and conclusions of the proposed methodology are presented.

2. Literature Review

For the first time, Data envelopment analysis were applied as a tool for analytical decision making in the field of purchasing and logistics management in a study by Kleinsorge et al. (1989). The authors illustrated how DEA can be used for analyzing the distribution of goods to markets. DEA has also been stated in the literature of vendor performance evaluation (Talluri et al., 2006; Weber et al., 2000; Weber, 1996, Weber and Desai, 1996; Weber et al. 1998; Narasimhan et al. 2001). Weber (1996) used DEA to evaluate vendors by considering unit price, percentage of rejects, percentage of late deliveries, business allocation units, etc and identified how DEA can be used to analyze vendors' performances based on multiple criteria. Weber et al. (2000) used DEA in conjunction with multi-objective programming (MOP). Talluri et al. (2006) also used the stochastic form of DEA for evaluating vendors' performance.

Garfamy (2006) proposed data envelopment analysis approach on the basis of total cost of ownership (TCO) for supplier selection. This research use DEA approach in evaluating the overall performance of suppliers based on multiple factors and TCO concept. Ramanathan (2007) integrated total cost of ownership and analytic hierarchy process approaches through the application of DEA in order to select appropriate suppliers. The recommended

methodology utilizes three types of DEA models including: the classical DEA model, supper-efficiency model and the assurance region model to aggregate the results of analytic hierarchy process (AHP) and TCO. Wu and Olson (2008) considered three kinds of risk evaluation for vendor selection within a supply chain including: chance constrained programming (CCP), data envelopment analysis and multi-objective programming (MOP) models. In the three stated method of risk evaluation, different risks were modeled in the style of probability and simulation of specific statistics distribution functions. Wu and Blackhurst (2009) presented a supplier and evaluation and selection methodology based on an extension of data envelopment analysis. They proposed a methodology termed augmented DEA to rank suppliers.

Wu (2010) developed a method to measure suppliers' performance by considering risk and uncertainty associated with supplier performance on multiple variables. The proposed methodology is an extension to the traditional stochastic DEA model. Chen (2010), described a methodology for supplier selection and evaluation in a supply chain which take into account strengths, weakness, opportunities, threats (SWOT) analysis and applied DEA and TOPSIS to evaluate and rank suppliers. Farzipoor Saen (2010) utilized data envelopment analysis for restricting weights in supplier selection decisions in the presence of dual role factors. The mentioned study considered multiple factors which play both inputs and outputs roles. Kang and Lee (2010) developed a supplier performance evaluation model based on AHP and DEA. In this research DEA is applied to evaluate quantitative factors and to transform the results into pair wise comparison values for AHP analysis. The ultimate rankings of suppliers are determined by utilizing both qualitative and quantitative results. Kuo et al. (2010) combined artificial neural network (ANN) and two multi-attribute decision analysis (MADA) methods: data envelopment analysis and analytic network process (ANP) in order to develop a green supplier selection model. The model which is called ANN-MADA hybrid method involves both practicality in traditional supplier selection attributes and environmental regulations. Zeidan et al. (2011) stated a method which considers both quantitative and qualitative variables in evaluating performance suppliers based on their efficiency and effectiveness. In the mentioned study, for qualitative performance evaluation of data fuzzy AHP and Fuzzy TOPSIS were used. DEA were also utilized to transform qualitative variables into quantitative variables. The Main attributes considered in literature related to DEA Models are shown in Table 2.

3. Service Quality

A service is an activity or series of activities in a less intangible nature that normally, but not necessarily, take place in interactions amongst customer and service employees and/or physical resources or goods and/or systems of the service provider, which are delivered to customer (Fitzsimmons, J.A., & Fitzsimmons; 2000). There are also several definitions for quality. Reeves and Bednar (1994) defined quality as excellence, value, conformance to specifications and meeting or exceeding customers' expectations. During the past few decades, scholars have recognized and discussed about this concept.

Service quality is a concept that has agitated considerable interest and discussed because of its difficulties in both defining and measuring it with no overall consensus (Wisniewski, 2001). A number of different "definitions" has been stated to explain service quality concept. One that is commonly used to explain service quality is the extent to which a service meets customers' needs or expectations (Wisniewski and Donnelly, 1996). Hence, Service quality can be defined as the difference between customer expectations of service and perceived service. If expectations are greater than performance, then perceived quality is less than satisfactory and hence customer dissatisfaction occurs (Parasuraman et al. 1985).

The concept of service quality was established after there had been a growing interest in the quality of goods served. Garvin (1988) was amongst the first scholars who examined the quality concepts to cover both goods and services. Garvin explained the perceived quality as the subjective perception of quality through indirect measures of quality comparison. Gronross (1993) introduced perceived service quality as a result of comparing the real experience with the expectation of a customer before consuming the service. Based on the perceived service quality concept Parasuraman et al. (1985) applied premises from other previous studies to form their model of service quality. The conceptual model of Parasuraman et al. (1985) includes five generic dimensions or factors which are as follows: (Kang et al., 2002)

(1) Tangibles. Physical facilities, equipment and appearance of personnel.

(2) Reliability. Ability to perform the promised service dependably and accurately.

(3) Responsiveness. Willingness to help customers and provide prompt service.

(4) Assurance (Including competence, courtesy, credibility and security). Knowledge and courtesy of employees and their ability to inspire trust and confidence.

(5) Empathy (including access, communication, understanding the customer). Caring and individualized attention

that the firm provides to its customers.

4. Data Envelopment Analysis

DEA is a powerful aggregate comparative method for evaluating the efficiency of organizations with multiple inputs and outputs. DEA has been developed by Charnes et al. (1978) as a generalization of the framework of Farrell (1957) on the measurement of efficiency. Farrell's approach was based on the production possibility set consisting of the conical hull of input-output vectors. This framework was generalized to include multiple inputs and outputs and reformulated as a mathematical programming model to assess the comparative efficiency of Decision-Making Units (DMUs). DMUs refer to the collection of firms, departments, divisions or administrative units with the same goals and objectives, and which have common inputs and outputs. The DEA approach uses a linear programming model to construct a hypothetical composite unit based on all units in the reference group. The performance of each DMU measured, is relative to the performance of all other DMUs (Al-Shammari , 1999).

4.1. The DEA Model for Measuring Vendor Efficiency

Data envelopment analysis is a mathematical programming methodology. It has been employed successfully for assessing the relative performance of a set of firms, usually called decision-making units (DMU), which use the same inputs to produce the same outputs. Assume that there are N DMUs, and the DMUs under consideration convert I inputs to J outputs. In particular, let the m_{th} DMU produce outputs y_{jm} using x_{im} inputs. The objective of the DEA exercise is to identify the DMUs that produce the greatest amount of outputs by consuming the least amount of inputs. A DMU is deemed to be efficient if the ratio of weighted sum of outputs to the weighted sum of inputs is the highest. The DMU defined in this study with input and output criteria are as follows: (Figure 1)

The DEA model used in this study takes the form of multiple inputs and single output. The multiple inputs, single output DEA modeling form measures the efficiency of DMUs by how well they minimize multiple input criteria to produce a single unit of output. In the following the revised Russell model will be used in order to solve the vendor selection problem.

The Russell measure model, named by Fare and Lovell (1978) and later revisited by Pastor et al. (1999) (referring to it as the enhanced Russell measure), is equivalent to Tone's SBM. Specifically, the model is as follows:

$$\text{Minimize} R_e = \frac{\frac{1}{m}\sum_{i=1}^{m}\theta_i}{\frac{1}{s}\sum_{r=1}^{s}\varphi_r}$$

where

$$\sum_{j=1}^{n}\lambda_j x_{ij} \leq \theta_i x_{io} \qquad i = 1,\ldots,m$$

$$\sum_{j=1}^{n}\lambda_j y_{rj} \geq \varphi_r y_{rio} \qquad r = 1,\ldots,s$$

$$\theta_i \leq 1 \qquad i = 1,\ldots,m$$

$$\varphi_r \geq 1 \qquad r = 1,\ldots,s$$

$$\lambda_j \geq 0 \qquad j = 1,\ldots,n$$

Re is the efficiency number

φ_i is the efficiency measure for output r

θ_i is the efficiency measure for input i;

λ_j are reference weights associated with vendor j;

m   is the number of input criteria;

s   is the number of output criteria.

n   is the number of vendors;

x_{ij} is the input criteria value for the i_{th} criteria and the j_{th} vendor;

y_{rj} is the output criteria value for the r_{th} criteria and the j_{th} vendor;

The linear programming of the above model is as follows:

$$Minimize \beta = \frac{1}{m} \sum_{i=1}^{m} \frac{t_i^-}{x_{io}}$$

where

$$\beta + \frac{1}{s} \sum_{r=1}^{s} \frac{t_r^+}{y_{ro}} = 1$$

$$\sum_{j=1}^{n} \mu_j x_{ij} = \beta x_{io} - t_i^- \qquad i = 1, \dots m$$

$$\sum_{j=1}^{n} \mu_j y_{rj} = \beta y_{ro} + t_r^+ \qquad r = 1, \dots s$$

$$\sum_{j=1}^{n} \mu_j = \beta$$

$$\beta, \mu_j, t_i^-, t_r^+ \geq 0, \quad j = 1, \dots, n, \quad i = 1, \dots m, \quad r = 1, \dots, s$$

5. Case Study

The empirical study in this paper is performed in Darakar Company. Darakar Co. is the greatest manufacturer company in water pipes industry in Iran. One of the most important materials which encompass more than 75 percent of the products is PVC. Hence, this material is so critical in this industry. So a set of 12 vendors is considered in the evaluation process. The vendors have been in contact with this company for more than two years. Management has considered price, the average of late deliveries, rate of rejected parts and service quality as four main factors in evaluating vendors. "Price" is represented on a per unit basis for each delivered item. "The average of late delivery times" is the average times that items have not been delivered on time and "Rate of rejected parts" is the percentage of parts that has not been compatible with the expected products in the past two years. Service quality is also Darakar Co.'s perception from the vendors' quality of services.

In this research, price, the average of late delivery times and rate of rejected parts are utilized as the input factors because they represent the cost paid by the company. Service quality is treated as output factor since it represent the benefit obtained by the company. The data of service quality criterion are gathered through a service quality checklist which is filled by experts of company. The data of DEA model are represented in table 3.

The service quality value is just measured through the perception of company from the vendors' services. The real PVC prices are also changed because of the sensitivity of company's information. Based on the proposed model, higher values of output and lower values of inputs are considered valuable.

6. Results

In order to follow this model, linear programming solution is performed for all vendors in this study. Results of the DEA model utilization are depicted in table 4. It is evident that vendor 2, 4, 7 and 11 are efficient with a rating of 1.000. The remaining vendors are inefficient. These scores assist the company in vendor selection decisions based on relative performance. The efficiency of vendors means that the higher output is achieved with the lower inputs. The vendor which has the lowest price is efficient. The vendor 11 with a price equal to 285 which is relatively high in compare with other vendors is classified as an efficient vendor. Vendor 2 has also the service quality score of 88 which is fairly less than others although this is an efficient vendor.

In order to rank efficient DMUs, Andersen-Petersen model is used. The ranking model in this study is as follows: (Andersen and Petersen, 1993)

$$Minimize \ \theta_o'$$

where

$$\theta_o' x_{io} - \sum_{\substack{j=1 \\ j \neq o}}^{n} x_{ij} \lambda_j \geq 0 \quad \text{for all} \quad i = 1, \dots, m$$

$$- \sum_{\substack{j=1 \\ j \neq o}}^{n} y_{rj} \lambda_j \leq -y_{ro} \quad \text{for all} \quad r = 1, \dots, s$$

$$\sum_{\substack{j=1 \\ j \neq o}}^{n} \lambda_j = 1$$

$$\lambda_j \geq 0 \qquad j = 1, \dots, n$$

θ'_o Unconstrained but assumed positive

Where:

θ'_o is the efficiency measure for employee o;

λ_j are reference weights associated with employee j;

m is the number of input criteria;

n is the number of employees;

s is the number of output criteria.

x_{ij} is the input criteria value for the i_{th} criteria and the j_{th} employee;

y_{rj} is the output criteria value for the r_{th} criteria and the j_{th} employee;

Ranking results are represented in table 5.

Results indicate that 4 DMUs are efficient. But it is possible to rank these 4 efficient vendors. These DMUs necessarily don't have better inputs and outputs criteria than others. The vendor 4, 2 and 7 have higher rank respectively while the rank of vendor 12 cannot be identified due to the inefficiency of Anderson and Peterson model. According to the tables 3, 4 and 5, vendor 4 has the highest rank amongst efficient vendors. This vendor has appropriate condition considering inputs and outputs. However it is not the best in all criteria. For example, service quality score of this DMU which is equal to 90, is not the best score. This vendor has not also the best price and average of late deliveries. So, it can be concluded that all the factors should be considered in evaluation process. A similar analysis can also be performed for inefficient vendors. The best efficiency amongst inefficient vendors is related to vendor 6. A general comparison of vendor 4 and vendor 6 reveals that both units have the same output. Amongst input criteria, DMU 6 has better condition than DMU 4 in average of late deliveries factor. Both vendors have somehow the same price. Therefore, it can be concluded that the difference between these two vendors is referred to rate of rejected parts. As it is shown in table 3, rate of rejected parts of vendor 6 is three times more than vendor 4. Thus, vendor 6 can move toward efficiency frontier through improving this criterion.

7. Conclusions

A key issue in the successful management of vendors is the measurement of vendor's efficiency to ensure that the best services are enhanced. An effective measurement system provides a fair framework for vendor selection. Efficiency measurement systems can be different in organizations. Thus a suitable and comprehensive approach is required to encompass all the vendors' services.

Development and application of multi criteria models for vendor evaluation have also received significant attention during the past decade. The utilization of multiple factors in vendor evaluation has been received significant attention in the literature (Weber et al., 1991). Weber et al. (1991) concluded that most of the articles reviewed in their work have utilized more than one criterion. The issue of efficiency associated with supplier performance is receiving more attention in the purchasing literature in compare with other functions. Efficiency evaluation is considered to be a critical element in selecting the most appropriate vendors with increasing number of vendors and with multiple criteria on which these vendors are evaluated, selecting the most efficient vendors is going to be more difficult.

In this paper, a model through DEA approach was developed in order to evaluate the efficiency of vendors. The paper also described how one firm can implement the DEA technique and use DEA modeling for measuring vendors' performance in multiple criteria relative to other vendors competing in the same marketplace. Based on results of the research, companies should consider multi criteria in vendors' evaluation because the vendors which are better at one criterion in compare with others necessarily do not provide the best services in other items. Thus, this approach can be useful for those organizations which they do consider multi criteria in vendor' evaluation.

This approach allows the purchasing manager to evaluate effectively each vendor's performance relative to the performance of the "best vendors" in the marketplace. This is possible through calculation of DEA efficiency measures. The results derived from DEA model can be used in order to calculate/determine benchmark values to compare with inefficient vendors. Another advantage of this model is the simplicity of calculating the factors of DEA model. In compare with the traditional subjective vendor evaluation techniques, the DEA approach provides an objective statement of how well vendors are performing, Provided that the firm has been collecting data on key vendor performance measures. The further researches can be done with more critical factors. Sensitivity analysis can

also be used for the measuring the influence of each factor for the efficient vendors. It is the hope of authors that the results of the DEA model presented in this paper will stimulate further researches in the use of DEA for vendor evaluation.

References

Ahn, H. J. & Lee, H. (2004). An agent-based dynamic information network for supply chain management. *BT Technology Journal*, 22(2), 18–27.

Al-Shammari, M. (1999). A multi-criteria data envelopment analysis model for measuring the productive efficiency of hospitals. *International Journal of Operations & Production Management*, 19(9), 879-890.

Andersen, P. & Petersen, N. C. (1993). A Procedure for Ranking Efficient Units in Data Envelopment Analysis. *Management Science*, 39(10), 1261-1264.

Braglia, M. & Petroni, A. (2000). A quality assurance-oriented methodology for handling trade-offs in supplier selection. *International Journal of Physical Distribution & Logistics Management*, 30(2), 96-111

Chapman, S.N. (1989). Just-in-time supplier inventory: An empirical implementation model. *International Journal of Production Research*, 27(12), 1993-2007.

Chapman, S.N., & Carter, P.L. (1990). Supplier/customer inventory relationships under just-in-time. *Decision Sciences*, 21, 35-51.

Charnes, A., Cooper, W. & Rhodes, E. (1978). Measuring the efficiency of decision-making Units. *European Journal of Operational Research*, 2(6), 429-44.

Chen, Y. (2010). Structure Methodology for Supplier Selection and Evaluation in a Supply Chain. *Information Sciences*, In Press Paper.

Fare, R.S. & Lovell, C.A.K. (1978). Measuring the technical efficiency of production. *Journal of Economic Theory,* 19, 150–162.

Farrell, M. (1957). The measurement of productive efficiency. *Journal of the Royal Statistical Society*, 120(3), 253-281.

Farzipoor Saen, R. (2010). Restricting weights in supplier selection decisions in the presence of dual-role factors. *Applied Mathematical Modeling*, 34(10), 2820-2830.

Fitzsimmons, J.A. & Fitzsimmons, M.J. (2000). *Service management: Operations, strategy, and information technology,* (3rd ed), Singapoor: Mc Graw-Hill.

Forker, L. B., & Mendez, D. (2001), An analytical method for benchmarking best peer suppliers, *International Journal of Operations & Production Management*. 21(1/2), 195–209.

Garfamy, R.M. (2006). A data envelopment analysis approach based on total cost of ownership. *Journal of Enterprise Information Management*, 19(6), 662-678.

Garvin, D. A. (1988). *Managing Quality: The Strategic and Competitive Edge.* (1st ed.), New York: The Free Press.

Gronroos, C. (1993). Quality comes to service. In E. E. Scheuing & W. F. Christopher (Eds.). *The Service Quality Handbook*. New York: AMACOM, pp. 17-24.

Hugos, M. (2003). *Essentials of Supply Chain Management,* New Jersey: John Wiley.

Kang G. D., James J. & Alexandris, K. (2002). Measuring of internal service quality, *Managing service quality* , 12(5), 278-291.

Kang, H. & Lee A.H.I. (2010). A new supplier performance evaluation model; A case study of integrated circuit (IC) packaging companies, *Kybernetes*, 39(1), 37-54.

Kleinsorge, I. K., Schary, P. B., & Tanner, R. D. (1992). Data envelopment analysis for monitoring customer–supplier relationships. *Journal of Accounting and Public Policy,* 11(4), 357-372.

Kleinsorge, I., Schary, P.B. & Tanner, R. (1989). Evaluating logistics decisions, *International Journal of Physical Distribution & Materials Management,* 19(12), 3-14.

Kuo, R.J. Wang, Y.C. & Tien, F.C. (2010). Integration of artificial neural network and MADA methods for green supplier selection. *Journal of Cleaner Production*, 18(12), 1161-1170.

Liu, F. H. F. & Hai, H. L. (2005). The voting analytic hierarchy process method for selecting supplier. *International Journal of Production Economics*, 97(3), 308–317.

Liu, J., Ding, F-Y. & Lall, V. (2000). Using data envelopment analysis to compare suppliers for supplier selection and performance improvement. *Supply Chain Management: An International Journal*, 5(3), 143–150.

Narasimhan, R., Talluri, S. & Mendez, D. (2001), Supplier evaluation and rationalization via data envelopment analysis: an empirical examination. *Journal of Supply Chain Management*, 37(3), 28-37.

Parasuraman, A., Zeithaml, V. A. & Berry, L. L. (1985). A conceptual model of service quality and its implications for future research. *Journal of Marketing,* 49, 41-50.

Pastor, J.T., Ruiz, J.L. & Sirvent, I. (1999). An enhanced DEA Russell graph efficiency measure, *European Journal of Operational Research,* 115, 596–607.

Ramanathan, R. (2007). Supplier selection problem: integrating DEA with the approaches of total cost of ownership and AHP. *Supply Chain Management: an international journal*, 12(4), 258-261.

Reeves, C.A. & Bednar, D.A. (1994). Defining quality: Alternatives and implications. *The Academy of Management Review*, 19(3), 419-424.

Talluri, S. & Narasimhan, R. (2003). Vendor Evaluation with Performance Variability: A Max-Min Approach. *European Journal of Operational Research*, 146(3), 543-552.

Talluri, S. & Narasimhan, R. (2004). A methodology for strategic sourcing. *European Journal of Operational Research*, 154(1), 236–250.

Talluri, S. & Narasimhan, R. (2005). A methodology for supply base optimization. *IEEE Transactions on Engineering Management*, 52(1), 130–139.

Talluri, S., Narasimhan, R. & Nair, A. (2006). Vendor performance with supply risk: a chance-constrained DEA approach. *International Journal of Production Economics*, 100(2), 212-222.

Weber, C.A. & Desai, A. (1996). Determination of paths to vendor market efficiency using parallel coordinates representation: a negotiation tool for buyers. *European Journal of Operational Research*, 90(1), 142-55.

Weber, C.A. (1996). A data envelopment analysis approach to measuring vendor performance. *Supply Chain Management*, 1(1), 28-39.

Weber, C.A., Current, J. & Desai, A. (2000). An optimization approach to determining the number of vendors to employ. *Supply Chain Management: An International Journal*, 5(2), 90-98.

Weber, C.A., Current, J.R. & Benton, W.C. (1991). Vendor selection criteria and methods. *European Journal of Operational Research*, 50(1), 2-18.

Weber, C.A., Current, J.R. & Desai, A. (1998). Non-cooperative negotiation strategies for vendor selection. *European Journal of Operational Research*, 108(1), 208-223.

Wisniewski, M. (2001). Using SERVQUAL to assess customer satisfaction with public sector services. *Managing Service Quality*, 11(6), 380-388.

Wisniewski, M., & Donnelly, M. (1996). Measuring service quality in the public sector: the potential for SERVQUAL. *Total Quality Management*, 7(4), 357-365.

Wu, D. (2009a). Supplier selection: A hybrid model using DEA, decision tree and neural network. *Expert Systems with Applications*, 36(5), 9105–9112.

Wu, D. (2009b). Supplier selection in a fuzzy group setting: A method using grey related analysis and Dempster–Shafer theory. *Expert Systems with Applications*, 36(5), 9105–9112.

Wu, D. & Olsen, D.L. (2008). Supply chain risk, simulation and vendor selection. *International Journal of Production Economics*, 114(2), 646-655.

Wu, D.D., (2010). A systematic stochastic efficiency analysis model and application to international supplier performance evaluation. *Expert Systems with Applications*, 37(9), 6257-6264.

Wu, T. & Blackhurst, J. (2009). Supplier Evaluation and Selection Augmented DEA Approach. *International Journal of Production Research*, 47(16), 4593-4608.

Zeidan, M., Coplan, C. & Cobanoglu, C. (2011). A combined methodology for supplier selection and performance evaluation. *Expert Systems with Applications*, 38(3), 2741-2751.

Table 1. Vendor evaluation methodologies (Talluri et al., 2006)

Methodology	Authors
Weighted Linear Models	Lamberson et al. (1976), Timmerman (1986), Wind and Robinson (1968)
Linear Programming	Pan (1989), Turner (1988)
Mixed Integer Programming	Weber and Current (1993)
Grouping Methods	Hinkle et al. (1969)
Analytical Hierarchy Process	Barbarosoglu and Yazgac (1997), Hill and Nydick (1992), Narasimhan (1983)
Analytical Network Process	Sarkis and Talluri (2002)
Matrix Method	Gregory (1986)
Multi-objective Programming	Weber and Ellram (1993)
Total Cost of Ownership	Ellram (1995)
Human Judgment Models	Patton (1996)
Principal Component Analysis	Petroni and Braglia (2000)
Data Envelopment Analysis	Narasimhan et al. (2001), Weber and Desai (1996), Weber et al. (1998)
Interpretive Structural Modeling	Mandal and Deshmukh (1994)
Game Models	Talluri (2002), Talluri and Narasimhan (2003)
Statistical Analysis	Mummalaneni et al. (1996)
Discreet Choice Analysis Experiments	Verma and Pullman (1998)
Neural Networks	Siying et al. (1997)

Table 2. Main attributes considered in DEA Models

Authors (years)	Main attribute in DEA model
Kleinsorge et al. (1992)	Bills, On time, Experience, Credence, Total cost and Shipments
Weber (1996)	Price, Percent rejects and Percent late deliveries
Weber et al. (1998)	Price, Percent rejects and Percent late deliveries
Liu et al. (2000)	Price, Delivery and Quality
Forker and Mendez (2001)	Role of the quality department, Role of top management and quality policy, Product/service design, Employee relations, Quality data and reporting, Training, Process management/operating procedures and Supplier quality management
Narasimhan et al.(2001)	Quality management practices, Documentation, Process/manufacturing capability, Management, Design/development capabilities, Cost and Delivery
Talluri and Narasimhan (2003)	Price, Quality and Delivery performance
Talluri and Narasimhan (2004)	Quality management practices and systems, Documentation and self-audit, Process/manufacturing capability, Management of the firm, Design and development capabilities, Cost reduction capability, Quality, Price, Delivery, Cost reduction performance and Other
Ahn and Lee (2004)	Capability and Price
Talluri and Narasimhan (2005)	Quality management practices and systems, Documentation and self-audit, Process/manufacturing capability, Management of the firm, Design and development capabilities, Cost reduction capability, Quality, Price, Delivery, Cost reduction performance and Other
Liu and Hai (2005)	Quality, Delivery, Responsiveness, Technical Capability, Facility, Financial, Discipline and Management
Talluri rt al. (2006)	Price, Quality and Delivery performance
Garfamy (2006)	Manufacturing cost, Quality cost, Technology cost, After sale service cost, Price and Item unit
Ramanathan (2007)	Manufacturing costs, Quality costs, Technology, Service
Wu T. and Olson (2008)	Cost, Accept rate and On-time Rate
Wu D. (2009a, 2009b)	Price, Quality and Delivery performance
Wu D. (2010)	Quality personnel, Quality procedure, Concern for Quality, Company history, Price-quality, Actual price, Financial ability, Technical performance, Delivery, Technical assistance, Production capability and Equipment

Table 3. Main attributes considered in DEA Models (Continued)

Authors (years)	Main attribute in DEA model
Kuo et al. (2010)	Quality, Cost, Delivery, Service, Environment and Corporate social responsibility
Kang and Lee (2010)	Defect rate, Price, Response to change time, On-time delivery rate, Process capability, Capacity, Technology, Partnership relationship
Chen (2010)	Quality, Cost, Delivery time, Service, Technical and production capability, Relation Combination and Organizational management
Zeydan et al. (2011)	New project management, Supplier management, Quality and environmental management, Production process management, Test and inspection and Corrective/preventive actions management

Table 4. Data of the DEA model

Vendor	Criteria				Vendor	Criteria			
	Input			Output		Input			output
	Price	The average of late Deliveries	Rate of Rejected Parts	Service Quality		Price	The average of late Deliveries	Rate of Rejected Parts	Service Quality
1	290	14	3	85	7	245	14	4	82
2	240	6	5	88	8	285	12	4	63
3	300	8	6	28	9	270	12	6	65
4	255	10	3	90	10	270	24	4	71
5	295	20	8	53	11	285	4	5	98
6	260	7	9	90	12	275	10	8	75

Table 5. Results of the DEA model

Vendor	Efficiency	Vendor	Efficiency
1	0.9445	7	1.0000
2	1.0000	8	0.6703
3	0.2857	9	0.6867
4	1.0000	10	0.7551
5	0.5409	11	1.0000
6	0.9736	12	0.7831

Table 6. Ranking results

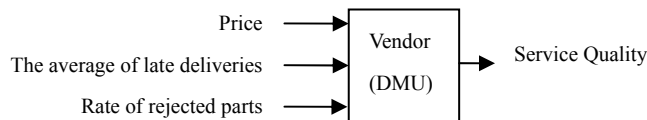| DMU	$\theta^{'}$
2	1.3510
4	1.6410
7	1.0091
11	Infeasible

Figure 1.The DEA model for vendor selection problem

Research on Communication Products Diffusion

in China Using Cellular Automata

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Abstract

Based on cellular automata (CA), the diffusion of communication products, namely the mobile phone (MP) and the landline telephone (LT), were modeled and simulated. The ordinary least squares (OLS) procedure and nonlinear regression method were carried out to estimate the diffusion parameters. The predicted results were compared with the actual data. It is found that: (1) the diffusion processes of mobile phone and landline telephone were successfully examined using cellular automata method, (2) the predicted results of mobile phone and landline telephone show four stages of the product life cycle, (3) the present situation of mobile phones in China is at the fast growth stage and the present situation of landline telephone is at the maturity stage, (4) the market of mobile communication is growing fast and has a brighter future and the landline communication market is meeting great challenges. The future competition will be more serious between the mobile communication and the landline communication. Both of them can benefit from introduction of advanced technology and new services because such a strategy has the potential to convert some consumers of one of communications into another communications. As for the whole communications, the innovation of technology and services will be generated and introduced into the industry of communications to drive the market.

Keywords: Diffusion, Cellular Automata, Simulation, Mobile Phone, Landline Telephone

1. Introduction

With the rapid growth of economy, China has become one of the world's largest communications markets. The communication industry can be classified by two types: mobile communications and telecommunications, and the communication products are mobile phone (MP) and landline telephone (LT), respectively. With the liberalization and deregulation of the operators in communications market, the diffusion process and development trend of the two communications has been gained great interest and significance.

Since innovation diffusion theory was introduced to the marketing studies in the mid-1960s, research among consumer behavior, marketing management, and marketing science has resulted in a lot of literatures (Arndt, 1967; Frank et al., 1964; King, 1963; Robertson, 1967; Silk, 1966). Traditionally, diffusion was defined as "the process by which an innovation is communicated through certain channels over time among the member of a social system" (Rogers, 1995). Diffusion theory is frequently looked to for guidance on the dissemination of new technologies, new

products, new services, and new regulatory initiatives (Gatignon and Robertson, 1985). The research in literatures on modeling of the new product or innovation diffusion offered a lot of frameworks for the study of diffusion of information, ideas, and products. The details of those diffusion models in this area are available in many articles (Mahajan and Muller, 1979; Sultan et al., 1990; Mahajan et al., 1990; Parker, 1994; Hauser et al., 2006; Meade and Islam, 2006).

Owing to the complexity of consumer behavior, the diffusion of new product based on adoption decision of consumers through social interactions among consumers can be considered a complex system problem. One of appropriate and convenient technique to model such complex systems is cellular automata (CA), which was described in detailed in some literatures (Wolfram, 1983; Wolfram, 1984; Chopard and Droz, 1998). The marketing sciences have recently exhibited an increasing interest in diffusion research using cellular automata method. Goldenberg et al. (2001a,b; 2002) examined the effects on new product growth of homogeneous and heterogeneity markets and the process of word-of-mouth and the reason for a major slump in cross-market sales through cellular automata. The models of emergence of innovations (Goldenberg and Efroni, 2001) and the resistance to innovations (Moldovan and Goldenberg, 2004) were established and simulated. The early success of new product was also predicted through the spatial data of sales based on cellular automata (Garber et al., 2004). Cellular automata was also used to simulate technology diffusion of internet (Fang et al., 2007) and market diffusion of new products and new services (Ma et al., 2008, 2009).

In order to reveal the underlying process of communications growth and to analyze the present and future market of communications, a cellular automata model was constructed to capture the complex diffusion dynamics and enable an in-depth analysis of the growth. The diffusion coefficients of mobile phones and landline telephones were estimated and their diffusion processes were simulated by cellular automata. The empirical evidences and predictions of the diffusion of communication products including mobile phones and landline telephones were provided in this paper.

The rest of this article continues as follows. Firstly, we proposed a diffusion model based on cellular automata. Secondly, the method and process of the simulation were presented. Thirdly, the diffusion processes of mobile phone and landline telephone were explored. Finally, we concluded by discussing the theoretical and practical implications.

2. The Cellular Automata Methodology

We begin our analysis by using a cellular automata methodology on the communication product diffusion. The cell space is the system of the communications diffusion including ten thousands cells. Each customer of the communication products or potential customer is a cell in the cell space which is the system of the communication products diffusion. There are two states which are customer (receiving the value of 1) or non-customer (receiving the value of 0). The state of the center cell at t depends on the state of eight neighbors at $(t-1)$. Each customer can always be a customer after the use in the whole communication product diffusion process. The premise of the Bass model (1969) is used as the evolution rule R of cellular automata

$$P(t+1) = p + \frac{q}{m} Y(t) \qquad (1)$$

where p is the innovation coefficient and q is the imitation coefficient, and P is the transfer probability from non-customer to customer. Each individual adoption probability is calculated by evolution rule at each cellular automata evolution step (CAES). $Y(t)$ is the cumulative number of previous customers at time t.

Simulations are implemented by calculating evolution rules of the communication products diffusion of both mobile phone (MP) and landline telephone (LT). The diffusion parameters are estimated by carrying out the ordinary least squares (OLS) procedure and nonlinear regression method by manipulating the Bass model (Bass, 1969). The data of customers of mobile phone and landline telephone come from Development Research Center of the State Council of P.R. China.

3. Results and Discussions

3.1 The diffusion of mobile phone

The diffusion parameters of the CA model of mobile phone (MP) are estimated using the actual annual data based on an OLS procedure, and the results are $p = 0.0056442$, $q = 0.29293$, $m = 1.2482 \times 10^5$. The predicted diffusion processes of MP in different CAES are shown in Figure 1. The diffusion results of the number of customers and cumulative number of customers of mobile phone are displayed in Figure 2 and Figure 3.

From Figure 1, it can be seen that: in the beginning, mainly due to external influences, diffusion of MP is happened evenly throughout the space, while in the later, mainly due to internal influences, diffusion of MP is regional

gathering.

From Figure 2 and Figure 3, it is found that: (1) the predicted results of the number of customers and cumulative number of customers of mobile phone show a bell-shaped curve and an S-shaped curve, respectively, (2) the predicted results of the number of customers and cumulative number of customers of mobile phones display the four stages (introduction stage, growth stage, maturity stage, and decline stage) of the life cycle of a new product, (3) the present situation of mobile phone in China is in the period of growth stage because the actual annual customer number of mobile phone is growing very fast and will reach the peak in the near future, although a steeper of fluctuation from 2003 to 2005 can be found, (4) with the market of mobile phone fast growing, advanced technology and new service will be created and introduced into the industry of mobile phone to drive the market into the period of maturity stage.

3.2 The diffusion of landline telephone

The estimated results of the diffusion parameters of the CA model of landline telephone (LT) are $p = 0.0017796$, $q = 0.30808$, $m = 6.4671 \times 10^4$. The diffusion results of the number of customers and cumulative number of customers of landline telephone are displayed in Figure 4 and Figure 5.

From Figure 4 and Figure 5, it can be seen that: (1) the predicted results of the number of customers and cumulative number of customers of landline telephone show a bell-shaped curve and an S-shaped curve, respectively, (2) the predicted results of the number of customers and cumulative number of customers of landline telephone display the four stages (introduction stage, growth stage, maturity stage, and decline stage) of the life cycle of a new product, (3) the present situation of landline telephone in China is in the period of maturity stage because the actual annual customer number of landline telephone have already reached the peak of the predicted curve (See Figure 4), (4) the market of landline telephone is going to enter the decline stage and gradually be out of the communications market, if the innovation of advanced technology and new services can not be involved in the landline telephone communication.

4. Conclusions

In this article, cellular automata method was used to model and simulate the communication products diffusion of mobile phone and landline telephone. The ordinary least squares (OLS) procedure and nonlinear regression method were carried out to estimate the diffusion parameters. The predicted results were compared with the actual data. Some significant conclusions can be made as follows.

Firstly, the diffusion processes of mobile phone and landline telephone in China were successfully examined using cellular automata method.

Secondly, the predicted results of mobile phone and landline telephone show four stages of the product life cycle, namely the introduction stage, the growth stage, the maturity stage, and the decline stage.

Thirdly, the present situation of mobile phone in China is at the fast growth stage, and the annual customer increments of mobile phone will reach the peak in the near future. With the market of mobile phone fast growing, advanced technology and new service will be created and introduced into the industry of mobile phone to drive the market into the period of maturity stage

Fourthly, the present situation of landline telephone in China is at the maturity stage, and the annual customer increments of landline telephone have already reached the peak of the predicted curve. The market of landline telephone is going to enter the decline stage and gradually be out of the communications market, if the innovation of advanced technology and new services can not be involved in the landline telephone communication

Finally, the results indicated that the market of mobile communication is growing fast and has a brighter future and the landline communication market is meeting great challenges. The future competition will be more serious between the mobile communication and the landline communication. Both of them can benefit from introduction of advanced technology and new services because such a strategy has the potential to convert some consumers of one of communications into another communications. As for the whole communications, the innovation of technology and services will be generated and introduced into the industry of communications to drive the market.

References

Arndt, J. (1967). Role of Product-Related Conversations in the Diffusion of a New Product. *Journal of Marketing Research*, 4 (August), 291-295.

Bass, F. M. (1969). A New Product Growth for Model Consumer Durables. *Management Science*, 15 (5), 215-227.

Chopard, B. and Droz, M. (1998). *Cellular Automata Modeling of Physical Systems*. Cambridge University Press.

Fang, L., Gong, X.G. and Xiao, R.B. (2007). Modeling diffusion of innovations with cellular Automata. *System simulation technology*, 3(2), 82-89 (In Chinese).

Garber, T., Goldenberg, J., Libai, B. and Muller, E. (2004). From Density to Destiny: Using Spatial Dimension of Sales Data for Early Prediction of New Product Success. *Marketing Science*, 23(3), 419-428.

Gatignon, H. and Robertson, T. S. (1985). A Propositional Inventory for New Diffusion Research. *Journal of Consumer Research*, 11(4), 849-867.

Goldenberg, J. and Efroni, S. (2001). Using Cellular Automata Modeling of the Emergence of Innovations. *Technological Forecasting and Social Change*, 68 (3), 293-308.

Goldenberg, J., Libai, B. and Muller, E. (2001a). Using Complex Systems Analysis to Advance Marketing Theory Development: Modeling Heterogeneity Effects on New Product Growth through Stochastic Cellular Automata. *Academy of Marketing Science Review*, 2001(2001), 1-19.

Goldenberg, J., Libai, B. and Muller, E. (2001b). Talk of the Network: A Complex Systems Look at the Underlying Process of Word-of-Mouth. *Marketing Letters*, 12 (3), 211- 223.

Goldenberg, J., Libai, B. and Muller, E. (2002). Riding the saddle: How cross-market communications can create a major slump in sales. *Journal of Marketing*, 66(2), 1-16.

Hauser, J., Tellis, G.J. and Griffin, A. (2006). Research on Innovation: A Review and Agenda for Marketing Science. *Marketing Science*, 25(6), 687-717.

Ma, F., Luo, M. and Yang, H.J. (2008). Simulation of Market Diffusion of New Product Based on Cellular Automata. In: 2008 Global Marketing Conference on Marketing in the Dynamic Global World. March, 20-23, Shanghai, China.

Ma, F., Luo, M., Peng, D.Y. and Deng, J. (2009). Simulation of New Service Product Diffusion on Cellular Automata. *Journal of Chinese Marketing*, 2(1), 88-94.

Mahajan, V. and Muller, E. (1979). Innovation Diffusion and New Product Growth Models in Marketing. *Journal of Marketing*, 43(4), 55-68.

Mahajan, V., Muller, E. and Bass, F.M. (1990). New Product Diffusion Models in Marketing: A Review and Directions for Research. *Journal of Marketing*, 54(1), 1-26.

Meade, N. and Islam, T. (2006). Modelling and forecasting the diffusion of innovation-A 25-year review. International Journal of Forecasting. 22(3), 519-545.

Moldovan, S. and Goldenberg, J. (2004). Cellular Automata Modeling of Resistance to Innovations: Effects and Solutions. *Technological Forecasting and Social Change*, 71 (5), 425-442.

Parker, Philip M. (1994). Aggregate diffusion forecasting models in marketing: A critical review. *International Journal of Forecasting*, 10 (2), 353-380.

Rogers, E. M. (1995). *Diffusion of Innovations*. (4th Ed.). New York: The Free Press.

Silk, Alvin J. (1966). Overlap Among Self-Designated Opinion Leaders: A Study of Selected Dental Products and Services. *Journal of Marketing Research*, 3 (August), 255-259.

Sultan, F., Farley, J. U. and Lehmann, D. R. (1990). A Meta-Analysis of Applications of Diffusion Models. *Journal of Marketing Research*, 27(1), 70-77.

Wolfram, S.(1983). Statistical Mechanics of Cellular Automata. *Reviews of Modern Physics*, 55 (3), 601-644.

Wolfram, S.(1984). Cellular automata as models of Complexity. *Nature*, 311(4), 419-424.

(a) CAES 1   (b) CAES 5

(c) CAES 10   (d) CAES 15
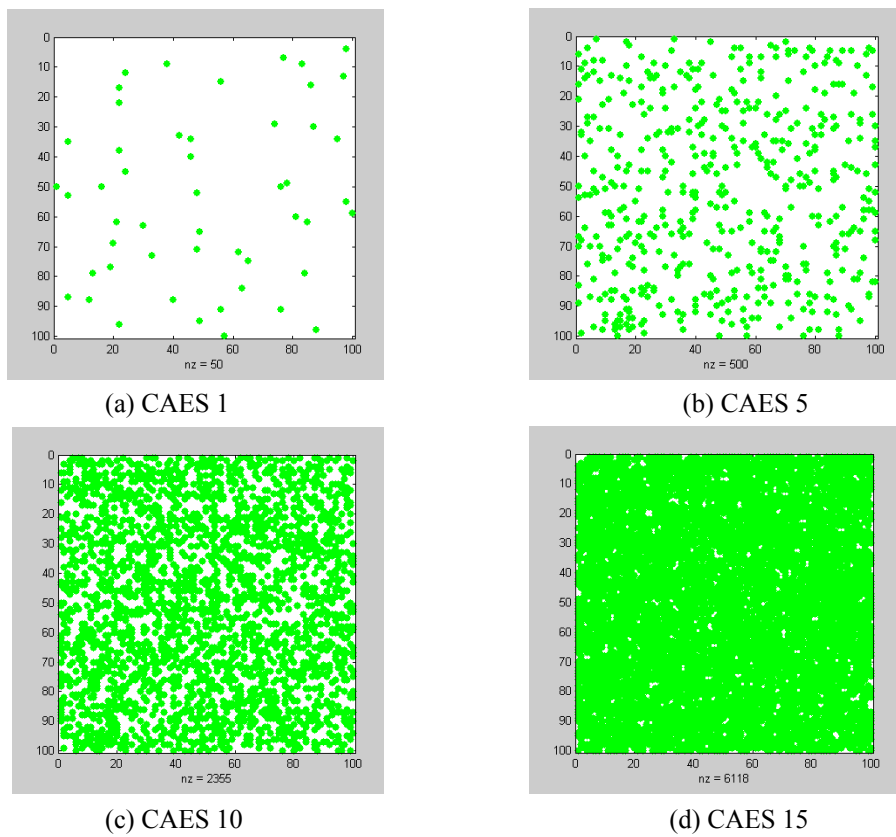
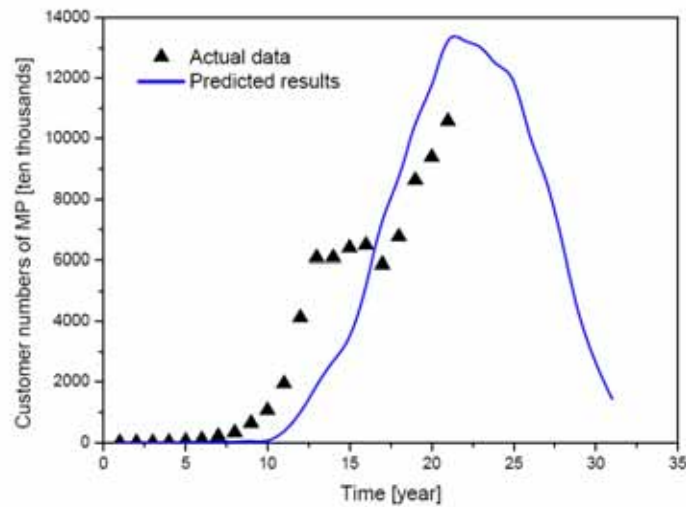Figure 1. Diffusion process of mobile phones under different CAES.

Figure 2. Customer numbers of mobile phone
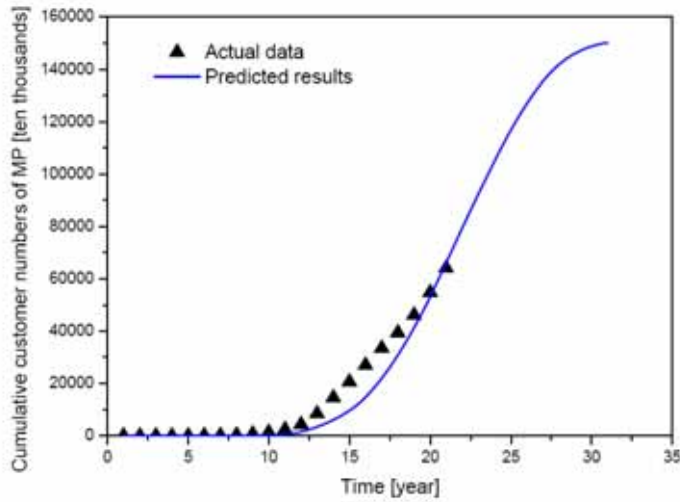
Figure 3. The cumulative number of customers of mobile phone
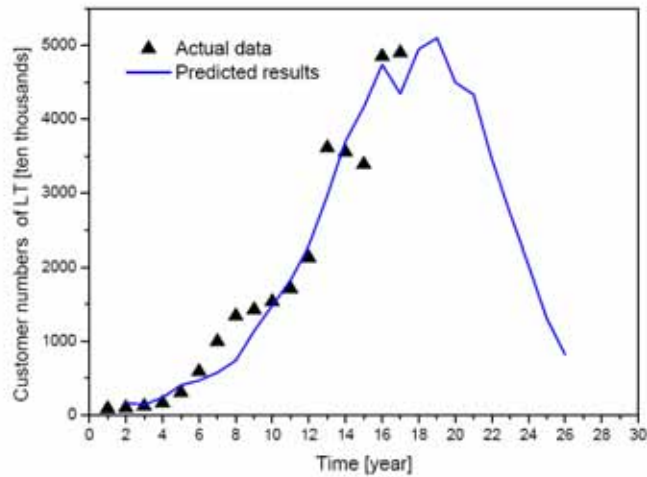
Figure 4. The number of customers of landline telephone
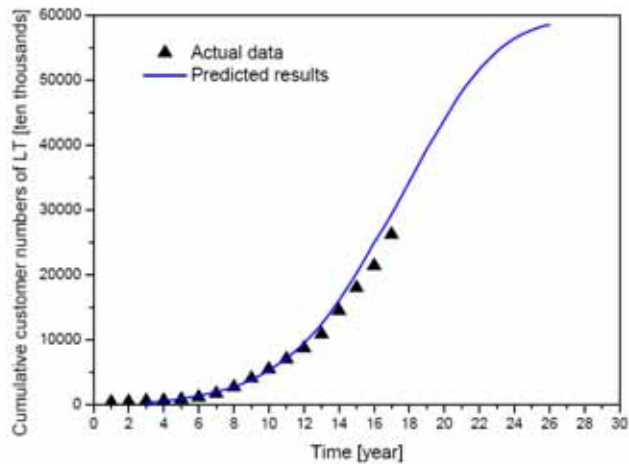
Figure 5. The cumulative number of customers of landline telephone

Measuring the Effect of Academic Satisfaction

on Multi-Dimensional Commitment:

A Case Study of Applied Science Private University in Jordan

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Abstract

The purpose of this study was to empirically test whether academic satisfaction (university vision, respect and recognition, relationship with colleagues, teamwork, incentives, management support, salary) has an effect on university commitment (affective, normative, continuance), The population comprised of academic staff in Applied Science Private University, a questionnaire survey was adopted to collect the primary data from the respondents whom they were randomly selected using a stratified sampling technique, a total of 300 questionnaires were administered to potential respondents from the 9 faculties.The study findings indicate that overall academic satisfaction has a statistical significant effect on overall university commitment, it also reveals that university vision, teamwork, management support, salary and work environment has more impact on overall university commitment than respect and recognition, relationship with colleagues and incentives.

Keywords: Academic Satisfaction, Commitment, Private University, Jordan

1. Introduction

Most research into job satisfaction has been undertaken in the business sector, with attempts often having been made to adapt these findings to higher education. Given the shortages of prospective faculty to fill the numerous vacancies that exist, the matters of job satisfaction, recruitment, and retention must be given priority attention (Okapara; Squillace and Erondu, 2004).

Employee satisfaction influences organizational performance as much as customer satisfaction. Employees are the internal customers of the business; they satisfy the current working environment and are willing to cooperate with the business to accomplish business goals. Therefore, academic staff requirements must be fulfilled to improve the working environment and enable them to achieve outstanding research and teaching performance. So It is in the interest of universities to retain academic staff and minimize turnover.

Since employee satisfaction has been found to be as important as customer (student) satisfaction (Oshagbemi, 1997a), research on higher education quality has now also begun to considering academic satisfaction (Comm and Mathaisel, 2003).Organizational commitment and job satisfaction have received significant attention in studies of the work place. This is due to the general recognition that these variables can be the major determinants of organizational performance and effectiveness (Lok and Grawford, 2003).

It is believed that when employees are dissatisfied at work, they are less committed and will look for other opportunities to quit. If opportunities are unavailable, they may emotionally or mentally "withdraw" from the organization. An understanding of the factors involved in job satisfaction is crucial to improving the happiness of workers. Second, there is a need to understand the attitudes of faculty towards their work (Okapara; Squillace and Erondu, 2004).

Determining job satisfaction factors relevant to university teachers could lead to improvements and innovations in teaching that would help retain them. Third, job satisfaction has often been linked to organizational commitment, turnover intentions, and absenteeism (Koh and Boo, 2000). These variables are costly to organizations, as they often lead to poor performance and high turnover. Fourth, from a theoretical perspective, it is essential to increase our understanding of this topic, thereby stimulating further research in the area. The aim of this study is to provide empirical evidence to ascertain which of the academic satisfaction variables have a positive significant impact on commitment to university.

2. Theoretical Background

2.1 Job Satisfaction

Buitendach and de Witte (2005) proffer the view that job satisfaction relates to an individual's perceptions and evaluations of a job, and this perception is in turn influenced by their circumstances, including needs, values and expectations. Individuals therefore evaluate their jobs on the basis of factors which they regard as being important to them (Sempane, Rieger & Roodt, 2002).

Oshagbemi (1997b) measured job satisfaction for 566 college teachers, which include:teaching; research; administration and management; present pay; promotions; supervision/supervisor behavior; behavior of co-workers; and physical conditions/working facilities.

Ku¨sku¨ (2001) proposed applying employee satisfaction surveys to the employees of a Turkish college, and applied the following dimensions for measuring their satisfaction: general satisfaction; management satisfaction; colleagues; other working group satisfaction; job satisfaction; work environment; and   salary satisfaction.

One of the arguments often brought against theories of job satisfaction is that they take little account of differences between people. What is wanted by one group of individuals in terms of a job is often different from what is wanted by another group. Personal correlates of job satisfaction have become a recent focus of at least some researchers' interest (Hickson and Oshagbemi, 1999).

Job satisfaction is one of the most frequently studied work attitudes.There are more than 12,000 job satisfaction studies published by the early 1990 (Kinicki et al., 2002).

A sizeable amount of work in the job satisfaction literature has been devoted to developing conceptual and operational definitions of the job satisfaction construct, including overall or general job satisfaction and satisfaction with facets of jobs such as the work itself, co-workers, supervision, pay, working conditions, company policies and procedures and opportunities for promotion (Oshagbemi, 2003).

2.2 Organizational Commitment

Organizational commitment has emerged as an important construct in organisational research owing to its relationship with work-related constructs such as absenteeism, turnover, job satisfaction, job-involvement and leader-subordinate relations (Arnolds & Boshoff, 2004; Bagraim, 2003; Eby, et al., 1999). Academics and human resource practitioners alike maintain a keen interest in organizational commitment because of its association with desirable outcomes, such as reduced absenteeism, reduced turnover, and improved job performance (Mathieu and Zajac, 1990; Meyer and Allen, 1997; Iverson and Buttigieg, 1999; Jaramillo et al., 2005).

It's important to note here that several authors argue that Organizational Commitment evolves into different forms. There is considerable overlap in the various models to explain these differences. For our purposes, we focus on the three-component model developed by Meyer and Allen (1991).which they developed a three-component model that observes similarities and differences in the conceptualizations of organizational commitment. Distinguishing different levels of commitment characterized by these different mindsets, Meyer and Allen labeled them "affective commitment", "normative commitment", and "continuance commitment", respectively. (Meyer and Allen,1991)

They proposed a three-component model of organizational commitment:

(1) Affective commitment that involves the employee's emotional attachment to, identification with and involvement in the organization.

(2) Continuance commitment that is based on the costs that the employee associates with leaving the organization or on a perceived lack of alternative employment opportunities.

(3) Normative commitment that involves the employee's feelings of obligation to stay with the organization.

3. Job Satisfaction and Organizational Commitment Relationship

Job satisfaction and organizational commitment are related, but distinguishable, attitudes. Job satisfaction is associated with the affective response to the immediate work environment, while organizational commitment is

more stable and enduring (Norris and Niebuhr, 1983). Employees may be temporarily dissatisfied with their jobs, but nevertheless remain committed to their organizations. Generally, employees will be satisfied with their jobs and committed to their organizations if they are content with the nature of the work itself, are satisfied with their supervisor and co-workers, and if they perceive current pay policies and future opportunities for promotion within their firm to be adequate (Reed; Kratchman and Strawser, 1994).

4. Literature Review

It was noted earlier that job satisfaction and organizational commitment are highly correlated .Martin and Bennett (1996) have identified from their review of literature four models of causal relationships between these two variables. In model 1 job satisfaction is viewed as antecedent to organizational commitment. Accordingly, as the employee continues to enjoy certain intrinsic and extrinsic benefits through performing his/her job, the employee experiences job satisfaction.

Joiner & Bakalis,(2006) found in their study that personal characteristics (gender, marital status, family responsibilities and education), job-related characteristics (supervisor support, co-worker support, role clarity and resource availability) and job involvement characteristics (tenure, second job and post-graduate study at the employing university) all impact on organizational commitment.

Harrison and Hubbard (1998) found in their study that job satisfaction is predictive of organizational commitment. Furthermore, Bhuian and Abdul-Muhmin (1997) found support for the influence of overall job satisfaction on organizational commitment. Yavas and Bodur (1999) and Yousef (2001) found strong association between satisfaction and organizational commitment.

5. Research Model and Hypothesis
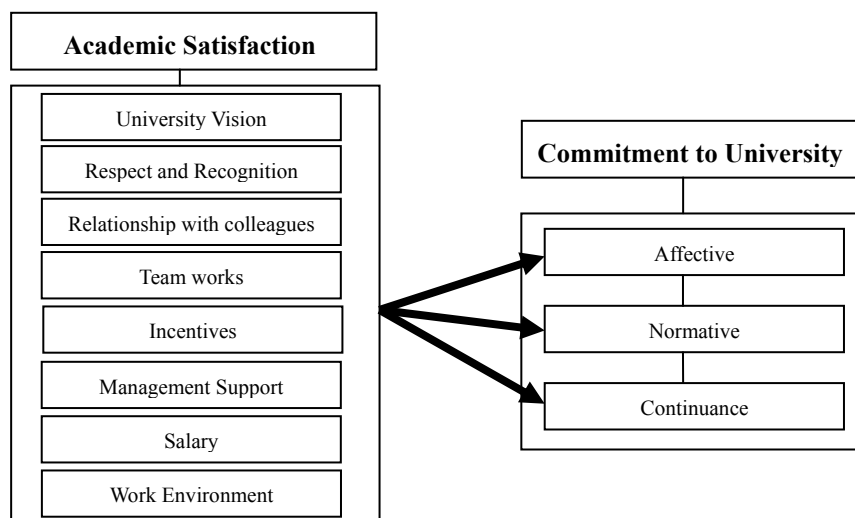
5.1. Hypotheses

The following null hypotheses were formulated:

Hypothesis 1: There is a positive significant impact of academic satisfaction on commitment to university. This hypothesis is subdivided into the following minor hypothesis:

Minor Hypothesis 1a: There is a positive significant impact of academic satisfaction on affective commitment.

Minor Hypothesis 1b: There is a positive significant impact of academic satisfaction on normative commitment.

Minor Hypothesis 1c: There is a positive significant impact of academic satisfaction on continuance commitment.

6. Methodology

6.1 Population and data Collection

The population comprised of academic staff in Applied Science Private University. A stratified sampling technique was used to select the instructors surveyed for this research from the 9 faculties, table 1 shows the percentage of each faculty against the total number of instructors for all surveyed faculties. A total of 300 questionnaires were administered to potential respondents. A total of 219 usable questionnaires were returned, giving a response rate of 73 percent

Instrument for primary data collection: A questionnaire survey was adopted to collect the primary data in this study, the questionnaire comprises two sections, the first section covers the demographic information (Gender, Rank, Nationality). The second section represents the instrument, we selected (54) items of academic satisfaction (university vision, respect and recognition, relationship with colleagues, teamwork, incentives, management support, salary, work environment) which were developed by the researchers based on the theoretical background and literature review (Martin and Bennett1996; Joiner & Bakalis,2006;Harrison and Hubbard 1998; Bhuian and Abdul-Muhmin 1997; Yavas and Bodur 1999; and Yousef 2001; Arnolds & Boshoff, 2004; Oshagbemi, 2003; Bagraim, 2003; Eby, et al., 1999). and (18) items of university commitment (affective, normative, continuance) which were adapted from the three-component model developed by Meyer and Allen (1991). All items were measured using a five-point Likert-type scale (ranging from 1 strongly disagree to 5 strongly agree).

6.2 Validity and reliability of the data.

6.2.1 Validity of data collected:

The instrument was submitted to a panel of experts for validation. The panel was asked to review the content of the items in each of the instruments and determine whether the items fell within the range of linguistic capabilities and understanding of the medical staff. The panel was asked to eliminate items or questions they considered to be irrelevant and to make suggestions for simplification of items that were not relevant. Some modifications were made Based on the comments and suggestions of the panel, which were taken into consideration.

6.2.2 Reliability of data collected:

The reliability of data collected was measured using Cronbach alpha coefficient; the reliability test was conducted to check for inter-item correlation of all variables in the questionnaire. The test results for over all instruments are 0.802, which exceeded the acceptable limit. (Zikmund, 2002)

6.3 Data analysis: In order to test the hypothesis, the following tools were used: multiple regression analysis was used to assess the effect of academic satisfaction on university commitment.

7. Data Analysis Results

In this section, simple regression analysis will be used to examine the prediction of overall academic satisfaction (university vision, respect and recognition, relationship with colleagues, teamwork, incentives, management support, salary) on university commitment (affective, normative, continuance), and multiple regression also was performed to examine the overall academic satisfaction on each dimension of university commitment independently, table 2,3,4,5 shows the simple and multiple regression results.

7.1 Major hypothesis testing result

Table (2) presents the results of regression analysis. The results indicate that there are significant impact of overall academic satisfaction on overall university commitment ($R^2 = 0.617$, $p < 0.05$). indicates that approximately 61 percent of the variance in university commitment can be accounted for by the eight academic satisfaction variables. Hence, the null hypothesis is rejected.

To find out which of the academic satisfaction variables predicted more variance on overall university commitment multiple regression was performed, table(2)shows the results. It reveals that university vision, teamwork, management support, salary (with negative effect) and work environment has more impact on overall university commitment (the Beta value for the predicted variables respectively are $\beta=0.204$, $\beta=0.267$, $\beta=0.270$, $\beta= -0.202-$, $\beta=0.204$, $P\leq0.05$) than respect and recognition, relationship with colleagues and incentives.

7.1.1 Minor Hypothesis 1a testing result

The results on table (3) shows that there are a statistical significant impact of overall academic satisfaction on affective commitment ($R^2= 0.344$, $p < 0.05$), this means that overall academic satisfaction explained 34 percent of the variance in affective commitment, thus the result provide supports for the minor hypothesis 1a.

To determine which of the academic satisfaction variables predicted more variance on university commitment, multiple regression was performed, table (3) shows the results. It shows that teamwork, management support and salary (with negative effect) has more impact on affective commitment (the Beta value for the predicted variables respectively are $\beta=0.305$, $\beta=0.339$, $\beta=0.-.202-$, $P\leq0.05$) than university vision, respect and recognition, relationship with colleagues, incentives and work environment.

7.1.2 Minor Hypothesis 1b testing result

The results shows that there are a statistical significant impact of overall academic satisfaction on normative commitment ($R^2= 0.377$, $p < 0.05$), this means that overall academic satisfaction explained 37 percent of the variance in normative commitment, thus the result provide supports for the minor hypothesis 1b.

To determine which of the academic satisfaction variables predicted more variance on university commitment, multiple regression was performed, table(4) shows the results. It shows that teamwork, management support and work environment has more impact on normative commitment (the Beta value for the predicted variables respectively are (β=0.286,β=0.296, β=0365, P≤0.05) than university vision, respect and recognition, relationship with colleagues, incentives and salary.

7.1.3 Minor Hypothesis 1c testing result

The results shows that there are a statistical significant impact of overall academic satisfaction on continuance commitment (R^2= 0.139, p < 0.05), this means that overall academic satisfaction explained 13 percent of the variance in continuance commitment, thus the result provide supports for the minor hypothesis 1c.

To determine which of the academic satisfaction variables predicted more variance on university commitment, multiple regression was performed, table(5) shows the results. It shows that respect and recognition, has more impact on continuance commitment (the Beta value for the predicted variable is (β=0.234, P≤0.05) than university vision, teamwork, management support, work environment, relationship with colleagues, incentives and salary.

8. Conclusion and Implications

8.1 Conclusion

The main purpose of this study was intended to measure whether academic satisfaction has a statistical significant effect on university commitment, it also intended to determine which of academic satisfaction variables has more effect on each dimension of university commitment as a case study in the applied science private university in Amman, Jordan. The findings reveal that overall academic satisfaction has a statistical significant effect on overall university commitment, the study also indicate that overall academic satisfaction has a statistical significant effect on each dimension of university commitment. This result confirms that university vision, respect and recognition, relationship with colleagues, teamwork, incentives, management support and salary (with negative effect) are important predictors of each dimension of university commitment (affective, normative, continuance).This study also reveals that university vision, teamwork, management support, salary and work environment has more impact on overall university commitment than respect and recognition, relationship with colleagues and incentives. The results of the study are found consistent with the prior study such as: Martin and Bennett1996; Joiner & Bakalis, 2006 Harrison and Hubbard 1998; Bhuian and Abdul-Muhmin 1997; Yavas and Bodur 1999; and Yousef 2001; Arnolds & Boshoff, 2004; Bagraim, 2003; Eby, et al., 1999.

8.2 Implications and limitations

As the study revealed the effect of academic satisfaction on university commitment, it is recommended here for the university decision makers to continually concentrate on leveraging the level of satisfaction for academic staff as they are the core of education system in the university, therefore they should develop a clear strategies to deal with the changing needs of academic staff to ensure their loyalty and commitment.

-      Findings of the study provide decision makers in the university with key information about the relationship between the variables of academic satisfaction and their commitment to their university in general and their work in particular.

-      It would be recommended to conduct a future research on other universities to investigate the effect of academic satisfaction on commitment as a comparison study to measure the differences.

-      This study, like all studies, has limitations. One main limitation is that the population is confined to one university as, the applied science private university, Thus the results of this study cannot be generalized to other universities.

References

Lok, Peter & Grawford, John. (2003).The effect of Organizational Culture and leadership style on job satisfaction and organizational commitment: A cross-national comparison, *Journal of Management Development,* Vol.23 No.4, 2004, pp.321-338.

Oshagbemi, T. (1997a). Job satisfaction profiles of university professors, *Journal of Managerial Psychology,* Vol. 12, No. 1, pp. 27-39.

Comm, C.L. & Mathaisel, D.F.X. (2003). A case study of the implications of faculty workload and compensation for improving academic quality, *The international Journal of Educational Management,* Vol. 17. Nos 4/5, pp. 200-10.

Okapara, O, John; Squillance, Michael & Erondu, A. Emmanuel. (2004). Gender differences and job satisfaction: a study of university teachers in the United States, *Women in Management Review*, Vol.20, No. 3, 2005, pp.177-190. [Online] Available: www.Emerald.com (November7, 2009).

Koh, H.C. & Boo, E.H.Y. (2000). The link between organizational ethics and job satisfaction: a study of managers in Singapore, *Journal of Business Ethics,* Vol. 29, pp. 309-24.

Norris, D.R. & Niebuhr, R.E. (1983). Professionalism, Organizational Commitment and Job Satisfaction in an Accounting Organization, *Accounting, Organizations and Society,* Vol. 9, pp.49-59.

Reed, sarah A., Kratchman, Stanley H.and Strawser, Robert H. (1994). Job satisfaction, Organizational Commitment, and Turnover Intentions of United States Accountants:The Impact of Locus of Control and Gender, *Accounting, Auditing &Accountability Journal,* Vol. 7, No. 1, pp.31-58.

Hickson, C. & Oshagbemi, T. (1999). The effect of age on the satisfaction of academics with teaching and research, *International Journal of Social Economics,* Vol. 26 No. 4, pp. 537-44.

Meyer, J. & Allen, N. (1991). A three-component conceptualization of organizational commitment, *Human Resource Management Review,* Vol. 1 No. 1, pp. 61-90.

Arnolds, C.A. & Boshoff, C. (2004). Does higher remuneration equal higher job performance? An empirical assessment of the need-progression proposition in selected need theories. *South African Journal of Business Management,* 31(2). 53-65.

Bagraim, J.J. (2003).The nature of measurement of multiple commitment foci 126 amongst South African knowledge workers. *Management Dynamics,* 1(2). 13-23.

Eby, L.T., Freeman, D.M., Rush, M.C., & Lance, C.E. (1999). Motivational bases of affective organisational commitment: A partial test of an integrative theoretical model. *Journal of Occupational & Organisational Psychology,* 72(4) 463-484.

Oshagbemi, T. (2003). Personal correlates of job satisfaction: empirical evidence from UK universities, *International Journal of Social Economics,* Vol. 30 No. 12, pp. 1210-1232.

Harrrison, J.K. & Hubbard, R. (1998). Antecedents to organizational commitment among Mexican employees of a US firms in Mexico, *The Journal of Social Psychology,* Vol.138, No.5, pp.609-23.

Bhuian, S.N. & Abdul-Muhmin, A.G. (1997). Job satisfaction and organizational commitment among guest-workers sales forces: the case of Saudi Arabia, *Journal of Global Marketing,* Vol.10 No.3,pp.27-44.

Yousif, D.A. (2001). Islamic Work ethics: a moderator between organizational commitment and job satisfaction in a cross-cultural context, *personal Review*, Vol.30 No.2,pp.152-69.

Yavas, U. & Bodur, M. (1999). Satisfaction among expatriate managers: correlates and consequences, *Career Development International,* Vol.4 No.5,pp.261-9.

Buitendach, J. & de Witte, H. (2005). Job insecurity, extrinsic and intrinsic job satisfaction and affective organisational commitment of maintenance workers in a parastatal. *South African Journal of Business Management,* 36(2). 27-37. 129.

Sempane, M., Rieger, H. & Roodt, G. (2002). Job satisfaction in relation to organisational culture. *South African Journal of Industrial Psychology*, 28(2). 23-30.

Kinicki, A., McKee-Ryan, F., Schriesheim, C. & Carson, K. (2002). Assessing the construct validity of the job descriptive index: a review and meta-analysis, *Journal of Applied Psychology,* Vol. 87, No. 1, pp. 14-32.

Martin, C.L. & Bennett, N. (1996).The role of justice judgment in explaining the relationship between job satisfaction and organizational commitment. *Journal of Group & Organizational Management,* 21 (1). 84-104.

Joiner, A. Therese & Bakalis, Steve.(2006). The Antecedents of Organizational Commitment: the case of Australian Casual Academics, *International Journal of Educational Management* , Vol. 20, No. 6 , PP.439-452.

Mathieu, J.E. & Zajac, D.M. (1990). A review and meta-analysis of the antecedents, correlates, and consequences of organizational commitment, *Psychological Bulletin,* Vol. 108, pp. 171-94.

Meyer, J. & Allen, N. (1997). *Commitment in the Workplace: Theory, Research and Application,* Sage, Newbury Park, CA.

Iverson, R.D. & Buttigieg, D.M. (1999). Affective, normative, and continuance commitment:can the 'right kind' of commitment be managed?, *Journal of Management Studies,* Vol. 36 No. 3, p. 307.

Jaramillo, F., Mulki, J. & Marshall, G. (2005). A meta-analysis of the relationship between organization commitment and salesperson job performance: 25 years of research, *Journal of Business Research,* Vol. 58 No. 6, pp. 128-705.

Oshagbemi, Titus. (1997b).Job Satisfaction Profiles of University Teachers, *Journal of Managerial Psychology*, Vol.12, No.1, PP.27-39.

Ku¨sku¨, F. (2001). Dimensions of employee satisfaction: a state university example, *METU Studies in Development,* Vol. 28 Nos 3/4, pp. 399-430.

Zikmund, William G. (2002). *Business Research Methods* (6th. ed.). Dryden Press, Harcourt College Publishers, New York.

Table (1). Details of sample selected for the study

Faculties	Percentage	Nationality	Percentage
Economic and Administrative Sciences	29.7	Jordanian	91.8
Engineering	16	Non Jordanian	8.2
I.T	11.9		
Pharmacy	7.3		
Arts	4.6		
Education	15.1		
Nursing	5.9		
Law	4.6		
Rank	Percentage	Gender	Percentage
Full Professor	8.7	Male	76.7
Associate Professor	18.7	Female	23.3
Assistant Professor	49.3		
Instructor	12.8		
Lecturer	10.5		

Table (2). Regression results: overall academic satisfaction on overall university commitment

Variable	Beta	t	Sig.*
University Vision	.204	2.073	.040*
Respect and Recognition	.139	1.397	.165
Relationship with Colleagues	.016	.165	.869
Teamwork	.267	2.612	.010*
Incentives	-.051-	-.583-	.561
Management Support	.270	3.173	.002*
Salary	-.202-	-2.263-	.026*
Work Environment	.204	2.546	.012*
(R^2 = .617; F=8.985) *Significant level at $p \leq 0.05$			

Table (3). Regression results: overall academic satisfaction on affective commitment

Variable	Beta	t	Sig.*
University Vision	.210	2.065	.289
Respect and Recognition	.088	.857	.393
Relationship with Colleagues	-.049-	-.483-	.630
Teamwork	.305	2.904	.004*
Incentives	-.088-	-.979-	.330
Management Support	.339	3.875	.000*
Salary	-.202-	-2.198-	.030*
Work Environment	.123	1.497	.137
(R^2 = .344; F=7.654) *Significant level at $p \leq 0.05$			

Table (4). Regression results: overall academic satisfaction on normative commitment

Variable	Beta	t	Sig.*
University Vision	.184	1.864	.065
Respect and Recognition	.017	.171	.865
Relationship with Colleagues	-.079-	-.812-	.865
Teamwork	.286	2.797	.006*
Incentives	-.085-	-.972-	.333
Management Support	.296	3.473	.001*
Salary	-.162-	-1.806-	.073
Work Environment	.365	4.547	.000*
(R^2 = .377; F=8.869) *Significant level at $p \leq 0.05$			

Table (5). Regression results: overall academic satisfaction on continuance commitment

Variable	Beta	t	Sig.*
University Vision	.062	.537	.592
Respect and Recognition	.234	1.988	.049*
Relationship with Colleagues	.188	1.637	.104
Teamwork	-.006-	-.046-	.963
Incentives	.070	.678	.499
Management Support	-.046-	-.461-	.645
Salary	-.094-	-.889-	.376
Work Environment	-.061-	-.642-	.522
(R^2 = .139; F=2.358) *Significant level at $p \leq 0.05$			

An Investigation into the Obstacles to Youth Entrepreneurship in South Africa

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Abstract

Youth entrepreneurial intention is very low in South Africa. The primary objective of this study is to investigate the obstacles to youth entrepreneurial intention. Two sets of questionnaires were self-administered to high school students and university students. The respondents were selected using simple random sampling method. Five-point Likert scale was used to measure the responses. Data analysis includes descriptive statistics, the principal component analysis and T-test. The results indicate that youths perceive lack of capital, lack of skill, lack of support, lack of market opportunities and risk as the main obstacles to entrepreneurial intention. Recommendations to reduce the obstacles to youth entrepreneurship are suggested.

Keywords: Youth, Entrepreneurship, Obstacles

1. Introduction

The literature has failed to come up with one specific definition which totally describes entrepreneurship. Various definitions have emerged in an attempt to explain entrepreneurship. According to Sathiabama (2010) entrepreneurship is a dynamic process of creating wealth by individuals or groups of individuals. Rwigema and Venter (2004:6) define entrepreneurship as the process of conceptualising, organising, launching and through innovation, nurturing a business opportunity into a potentially high growth venture in a complex and unstable environment. Entrepreneurship is a vehicle to economic growth, success and prosperity. Herrington, Kew and Kew (2009 point out that an entrepreneur is one that shifts economic resources out of an area of low productivity into an area of higher productivity and greater yield. An entrepreneur is one who organises, manages and assumes the risk of a business enterprise

According to Pihie (2009:341) entrepreneurship can be measured in two ways: Actual entrepreneurship (i.e. people that have actually started business) and entrepreneurial intention or latent entrepreneurship (i.e. people that intend to start business). This study focused on latent entrepreneurship. Vesalainen and Pihkala (2000:145) define latent entrepreneurship as a conscious state of mind that directs attention (and therefore experience and action) toward a specific object (goal) or pathway to achieve it (means). Latent entrepreneurs wish to be self-employed in the future and have the possibility to realise self-employment with adequate policy. Pihie (2009:341) notes that intention is the state of mind or attitude which influences entrepreneurial behaviour. A strong association exists between the entrepreneurial intention and the actual behaviour. Henley (2007) points out that entrepreneurship is an intentional activity, in that for many those intentions are formed at least a year in advance of new venture creation. This suggests that there is a link between entrepreneurship and intention.

In South Africa, both latent and actual entrepreneurship is very low compared to international standards. The Total Entrepreneurship Activity (TEA), which is an estimate of the number of working age adults involved in starting or operating businesses up to 3.5 years old, is one of the lowest in the world (Orford, Wood, Fischer, Herrington & Segal, 2003). TEA is a measure of people in the 18-64 age group who are actively involved in the start-up process or

those managing a business less than forty two months old. The TEA rate inSouth Africa in 2008 was 7.8% which is significantly below the average of 13.2% for the countries that participated in the Global Entrepreneurship Monitor (GEM) annual review (Herrington et al. 2009).

According to Von Broembsen, Wood and Herrington (2005) youths in South Africa are far less likely to start their own businesses compared to those from other countries. The low entrepreneurial activity among youths is one of the primary reasons for the low overall rate of entrepreneurial activity in South Africa. In South Africa, youths are defined as those within the (14-35) age range as mandated by the National Youth Commission Act of 1996 and the National Youth Policy of 2000 (Government Gazette, 2008).

The weak participation of youths in the entrepreneurial process becomes very important in the light of the high rate of youth unemployment in South Africa. Statistics South Africa (2010) notes that South Africa is faced with a very high unemployment rate of 25,2%. Unemployment is highest among the youths especially those in the 15-34 age bracket. About thirty percent (30%) of all people in the 15-24 age group, are unemployed and in the 25-34 age group, forty percent (40%) are unemployed. Therefore, seventy percent (70%) of the unemployed people are youths and of those, forty-seven percent (47%) are chronically out of work. This implies that youth unemployment rate is more than twice higher the national average.

Herrington *et al*. (2009) point out that the growing body of unemployed youths in South Africa places an additional burden on limited government budget that already has a large number of demands on it. Young people's engagement in entrepreneurship helps them to achieve economic independence and reduce their reliance on state welfare. Youth entrepreneurship brings about self esteem and makes the youths more productive members of their families and communities. Youth entrepreneurship brings about growth in an economy in that, by providing employment, the employees and the business would pay taxes thus contributing to government revenue. Entrepreneurship including youth entrepreneurship improves the general standard of society as a whole, which leads to political stability and national security. Youth entrepreneurship reduces crime, poverty and income inequality. This indirectly induces an environment for national and regional economic growth and development (Mutezo 2005: 33).

Thus, an investigation of the possible obstacles to youth entrepreneurship is essential. This study focuses on the youths in the high schools and universities. Kazela (2009) points out the two groups of youths most likely to be involved in entrepreneurship are high school and university graduates. A meta analysis of studies on entrepreneurship in South Africa revealed that no South African study has investigated empirically barriers to youth entrepreneurship with a focus on both university and high school students.

2. Research objective

According to Von Broembsen et al. (2005) entrepreneurship is one of the solutions to the high rate of youth unemployment in South Africa. However, youth entrepreneurship is very low in South Africa. The primary objective of this study is to investigate empirically the obstacles to youth entrepreneurship in South Africa.

3. Literature review

3.1 Theoretical construct

Theories of entrepreneurial intention include Ajzen and Fishbein's 1975 theory of reasoned behaviour, Shapero and Sokol's entrepreneurial event theory of 1982, Bandura's process driven theory of 1991 and Ajzen's theory of planned behaviour of 1991. Ajzen and Fishbein's (1975) theory of reasoned action declare that behaviour is greatly influenced by one's intention to engage in that behaviour and intentions are influenced by attitude towards the behaviour. This implies that intention comes first before the actual behaviour. Another theory of entrepreneurial intention is the process driven theory developed by Bandura in1986. Bandura reasoned that, behaviour is dependent upon an individual's perception that they can carry out the intended action. According to the process driven theory, external environment influences thoughts, which shape attitude and form intention, which if strong enough leads one to action. Shapero and Sokol's (1982) introduced the entrepreneurial event theory. The theory examines life path changes and their impact on individual desirability and perceptions of feasibility related to new venture formation. The underlying assumption of the entrepreneurial event theory is that, critical life changes (displacement) precipitate a change in entrepreneurial intention and subsequent behaviour. Displacement can occur in a negative form such as job loss or a positive form such as financial support. The intention to become an entrepreneur therefore depends on the individual perceptions of desirability and feasibility in relation to that activity.

This study will focus on Ajzen's (1991) theory of planned behaviour. This theory focuses on intentions by an individual which will determine the actual behaviour towards something. According to Ajzen's theory of planned behaviour, there is a relationship between the intention to be an entrepreneur and the act of becoming one. Thus,

one's intention greatly explains the behaviour. Entrepreneurial intentions are the first step in the evolving and sometimes, long-term process of venture creation. The underlying assumptions of this theory are that:

• Much human behaviour is planned and therefore preceded by intention towards that behaviour.

• Human beings are rational and make systematic use of information available to them when making decisions.

• Intention predicts planned behaviour

3.2 Empirical review

Pretorius and Shaw (2004:223) and Atieno (2009:33) report that lack of finance is one of the major constraints to the formation of new enterprises.   Entrepreneurs need to access to both internal and external finance to reduce the survive and grow. Maas and Herrington (2006) indicate that lack of financial support is the second major contributor to the low TEA rate in South Africa. Pretorius and Shaw (2004) observe that a large percentage of the failure of entrepreneurial ventures in South Africa is attributed to inadequate capital structure or resource poverty.

According to Lefebvre and Lefebvre (2002:285) and Peterman and Kennedy (2003:131) managerial competency and skills are important for new firm formation. Robertson, Collins, Medeira and Slatter (2003:309) and Bosma, Van Praag, Thurnik and De Wit (2004:227) find that the endowed level of talent of a small business founder is the investment in industry-specific and entrepreneurship-specific human capital which contributes significantly to the performance of new small firm. Herrington and Wood (2003) in the Global Entrepreneurship Monitor Report point out that lack of education and training have reduced management capacity and entrepreneurship in South Africa. The quality and context of the educational system do not promote the development of managerial competencies. This is consistent with the findings of Herrington *et al.* (2009) that the most crucial factor hindering entrepreneurship in South Africa is lack of education and training. The quality of basic education has deteriorated in South Africa. More than half of the students in high schools in South Africa do not complete their Matric. Lack of basic business skills is a constraint to entrepreneurial intention.

Social and cultural factors can also have an influence on youth latent entrepreneurial intention. Chigunta (2002) finds evidence from developing countries that participation of youths varies with gender and young men are more likely to be self employed than young women. These findings appear to suggest the existence of socio-cultural constraints which tend to affect the participation rate of young women. In addition, most potential entrepreneurs are not aware of government programmes specifically designed to help them. Ndhlovu and Twala (2007) find that access to government financial support is a problem in South Africa. Lack of awareness of the existence of government programmes is another problem faced by youth. Mass and Herrington (2006) agree that most youths are not aware of the various support programmes available and as a result, youths with entrepreneurial tendencies perceive that there is no support from government.

One of the obstacles to the success of an enterprise is lack of willingness to take risk. Fear of failure and embarrassment prevent people with ideas not to explore them and venture into a competitive stage. Many young entrepreneurs become risk averse because of their social environment (Kazela, 2009). In addition, South Africa is characterised by a high crime rate. South Africa ranks in the world's top five countries with the highest murder rates Crime causes stress and additional costs for security and this retards the development of emerging markets such as South Africa. Brown (2001:270) asserts that business is the largest organised group suffering from crime and violence. According to the South African Police Service Crime Statistics (2009) while the incidences of virtually all major categories of crime has fallen during the past year, business related crime is on the increase. Such crimes include burglary at non-residential premises which rose by 6.8%, commercial crimes went up by 4.8% and shoplifting rose by 1.3%. The actual raw number of robberies at business premises went up by a massive 47.4% from 6,689 to 9,862 between 2006 an 2008. Most of these robberies were on small business premises. This suggests that the fear of crime can impact on entrepreneurial intention.

Ehlers and Lazenby (2007:108) provide evidence that economic forces can influence market opportunities and ultimately result in prosperity or adversity. on organisations in different industries and in different locations. If youths have negative perception regarding the environment of the business, they might decide not to start their own business. Mollentz (2002) affirm that market issues and demand for   products are the most important factors that positively influence new enterprises growth. Thus, bad market conditions and no market opportunities can be a constraint to youth entrepreneurial intention.

4. Research methodology

4.1 Population and sample

The study focuses on final year University of Fort Hare and Walter Sisulu University students in the Eastern Cape province of South Africa as well as final year students   selected from twenty high schools in the the same province.

The Planning and Development Department at the University of Fort Hare in Alice campus and the Bereau for Institutional Research and Planning at Mthatha campus of Walter Sisulu University, provided statistics of the registered final year students for 2009 for both institutions. According to the statistics obtained, the total final year students for the two universities in 2009 were two thousand and eleven students. For high schools students, the population was obtained from the school principals and clerks. The population of high school students was seven hundred and sixty. The researcher used the probability sampling method for the study. The sample size was determined through the use of Raosoft sample size calculator. Raosoft sample size calculator takes into consideration four factors in determining sample size. These factors include the margin of error, the confidence level, the population and the response distribution. Using Raosoft sample size calculator, the minimum recommended sample sizes for university and high school students were three hundred and three and two hundred and fifty six respectively.

The questionnaire predominantly made use of Five-point Likert scale with 1 meaning strongly disagree to 5 meaning strongly agree to determine the obstacles to youth latent entrepreneurship. Close-ended questions were used for demographic variables. The research instrument was developed taken into consideration other similar studies such as Wong and Choo (2009), Benzing *et al.* (2009) and Pihie (2009). The questionnaire was pre-tested on a sample of forty respondents from both high schools and universities. The Cronbach's alpha was used as the measure of reliability. The normality of the data was determined by using the Kolmogorov-Smirnov test. The pairwise deletion method was used to treat missing values. The data analysis was done using descriptive statistics, T-test and the principal component analysis. Cooper and Schindler (2003:591) describe principal component analysis as a multivariate statistical method used to describe variability among observed variables in terms of fewer unobserved variables called factors.   Principal component analysis could be used to verify a construct of interest. Prinicipal component analysis has two main purposes. Firstly, it is used for data reduction and secondly for detection of structure (underlying dimensions) in a set of variables. Leech, Barrett and Morgan (2005:79) point out that the decision about which factor to retain depends on the percentage of the variance accounted for the variable, the absolute variance accounted for by each factor, and whether the factor can be meaningfully interpreted. Factors with Eigenvalues greater than one are usually retained.

5. Results and discussions

5.1 Response rate and demographics

The total number of questionnaires distributed to both high school and university students were five hundred and seventy nine and three hundred and fifty seven were returned which represents a response rate of 61.7%. Majority of the respondents for both high school and university students were 24years and below, followed by the 25-29 age range and the 30-34 had the least representation with high school students not having a representation in that range. Female respondents constituted of eighty seven (87) for university students and 69 for high school students. One hundred and nine (109) respondents from university students and ninety two (92) for high school students were male. 69.37% of the university students' respondents were undergraduates while 30.63% were post graduate students. Almost uniform representation for all faculties was obtained for university students.

5.2 Obstacles to youth entrepreneurship

Table 1 presents the descriptive statistics for obstacles to entrepreneurial intention by university students and high school students.

Insert Tables 1here

The results for the university students indicated that lack of savings (4.90), fear of crime (4.89) and lack of collateral (4.75) had the highest means while right partner difficulty (1.02), no one helping (1.79) and no people encouraging (1.93) had the lowest means. For high school students, do not have a good idea (4.96), lack of savings (4.79) and fear of crime (4.51) had the highest means while repaying school loans (1.03), no family member did it (1.06) and right partner difficulty (1.79) had the lowest means. The results indicate that for both university and high school students, lack of capital is a major obstacle to entrepreneurial intention. In addition, both sets of respondents perceive lack of skill, support and market opportunities as obstacles to entrepreneurial intention. High school students tend to have a higher fear of risk than university students.

Tables 2 and 3 present the rotated factor matrix (for university students) and high school students

Insert Tables 2 and 3 here

For university students, five factors with Eigenvalues greater than one account for 81.68% of the percentage of variance explained. Factor one was labelled as *lack of capital*. The Eigenvalue for the factor is 16.76. The factor includes five items. This is the most important factor according to the factor analysis. Cronbach's alpha for the

factor yielded a value of 0.861, indicating the reliability of the factor.Factor two was labeled *lack of skill*. The Eigenvalue for the factor is 9.49. The factor includes six items. Cronbach's alpha for the factor yielded a value of 0.730.Factor three was labelled *lack of support*. The Eigenvalue for the factor is 6.26. The factor includes three items. Cronbach's alpha for the factor yielded a value of 0.711.Factor four was labelled *lack of market opportunities*. The Eigenvalue for the factor is 4.38. The factor includes two items. Cronbach's alpha for the factor yielded a value of 0.807. Factor five was labelled as *risk*. The Eigenvalue for the factor is 3.50. The factor includes six items. Cronbach's alpha for the factor yielded a value of 0.820.

The results for high school students indicate that, five factors with Eigenvalues greater than one account for 87.05% of the total variance. Factor one was labelled as *lack of capital*. The Eigenvalue for the factor is 15.223. The factor includes four items. This is the most important factor according to the factor analysis. Cronbach's alpha for the factor yielded a value of 0.844, indicating the reliability of the factor. Factor two was labelled *lack of skill*. The Eigenvalue for the factor is 4.502. The factor includes six items. Cronbach's alpha for the factor yielded a value of 0.812. Factor three was labelled *risk*. The Eigenvalue for the factor is 2.926. The factor includes six items. Cronbach's alpha for the factor yielded a value of 0.807. Factor four was labelled *lack of support*. The Eigenvalue for the factor is 2.774. The factor includes two items. Cronbach's alpha for the factor yielded a value of 0.792. Factor five was labeled *lack of market opportunities*. The Eigenvalue of the factor is 2.971. The factor includes two items. Cronbach's alpha for the factor yielded a value of 0.518.

The T-test was used to investigate if there are significant differences in the mean scores of university students and high school students. The T-test shows an insignificant difference in the mean scores of the two sets of respondents.

Insert Table4 here

6. Managerial implications and recommendations

According to Ajzen's theory of planned behaviour, there is a relationship between the intention to be an entrepreneur and the act of becoming one. The results of this study indicate that there are obstacles to youth entrepreneurial intention in South Africa. This will negatively impact on youth actual entrepreneurship. One of the reasons why South African youths are unwilling to get into entrepreneurship is lack of access to capital, lack of business skills, government support, risk and weak market opportunities.

Entrepreneurship education is one of the initiatives that can be designed to enhance skills and knowledge in entrepreneurship. Entrepreneurial skills include creativity, innovation, risk-taking and ability to interpret successful entrepreneurial role models and identification of opportunities. Entrepreneurial education thus provides basics of such practical business practices. Low levels of financial literacy can influence the degree to which entrepreneurs access formal sources of finance. Entrepreneurship education should be made accessible to all tertiary learners in order to be equipped for business practices. In addition, expert financial training greatly increases the chances of entrepreneurs securing appropriate and affordable finance. To develop further entrepreneurial finance skills and competencies, government can work with organizations such as the South African Banking Association to develop training focusing on finance skills and competencies. In addition, there is the need for more national, regional or specialist support and resources is required to drive up the graduate entrepreneurship rate.

There is an evident skills mismatch between what skills graduate entrepreneurs developed in higher education and what they need in order to survive in the business world. It is recommended that university students and high school students should go for industrial attachments for at least a year during their study to gain valuable business and technical experience. Educational institutions should introduce and strengthen entrepreneurial education. When learners are oriented into entrepreneurship from an early age, it becomes easier to develop successful ventures. There is the necessity for government support initiatives to be efficient. These institutions established by government could take a step in involving the youths by exposing them to their programs, informing them of what they expect from the students in order to receive their full assistance and select a few of them for assistance. Government agencies such as SEDA, Development Corporations can organize practical trainings for students involved in entrepreneurship education or who would like to be involved in entrepreneurial practices. Non-governmental organisations should be well funded through local and international grants to help with the training need of graduate entrepreneurship. Training seminars can also be organized regularly to students involved. Furthermore, a "learning from peers" or mentorship approach can be instituted by government agencies to help students to get involved in entrepreneurship trainings at tertiary institutions. Awareness campaign of government support instruments should be done.

The lack of safety and security in South Africa is causing fear in the development of emerging markets. Government should work in partnership with organisations such as Business against Crime South Africa and Business Unity South Africa to reduce or free the society of crime. The legal system needs to be more efficient so that criminal

cases against businesses can be dealt with quickly. There is also a need for a well-publicized campaign against crime. More effective policing is needed, including better police visibility, area coverage and faster response times.

The culture of dependency should be reduced through awareness campaign by the government. Youths from historically disadvantaged communities should be informed that social grants will not last forever. Therefore, youths should take entrepreneurship as a career rather than depending on government for grants.

This study recommends that excessive and over complex regulations should be loosened in the case of first time registration for business. This will encourage the youths to register for business. Entrepreneurship awareness day could be organised where individuals will be informed about how to register a business and how much it costs to register a business. Universities and high schools can also be used as sources of information to the students about entrepreneurial opportunities. Entrepreneurship should be encouraged and embedded in education from early formative years through secondary education and be part of the curriculum in all stages of education and all subjects. To achieve this objective, there is the need to teach teachers in entrepreneurial and commercial skills.

7. Limitations of the study and areas for further research

The study was mainly based on the perceptions of the youths. A limitation might arise in that possible differences may exist between "perception" and "reality". Another limitation of this study is that it investigated the constraints to youth latent entrepreneurship from students who are in the education system. However, there are some youths who are out of school, who are jobless that would have qualified for this study but were not included. Business culture is lacking in most university graduates hence this should be explored further in a study. Further studies can investigate the barriers faced by actual entrepreneurs (i.e. youths that have actually started their business). This could help to reduce the high failure rate of small entrepreneurial firms in South Africa.

References

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*, 179-211.

Ajzen, I. & Fishbein, M. (1975). *Belief, attitude, intention and behavior. An introduction to theory and research*, Boston: Addison Wesley.

Atieno, R. (2009). Linkages, access to finance and the performance of small-scale enterprises in Kenya. *Journal of Accounting and Business Research*, 3(1), 33-48.

Bandura, A. (1991). Social-cognitive theory of self-regulation. Organizational Behavior and Human Decision Processes, 50, 248-287.

Benzing, C., & Chu, M. H. (2009). A comparison of motivations of small business owners in Africa. *Journal of Small Business and Enterprise Development,* 16(1), 60-77.

Bosma, N., Van Praag, M., Thurik, R., & De Wit, G. (2004). The value of human and social capital investments for the business performance of start-ups. *Small Business Economics*, 23(1), 227 – 236.

Brown, K.V. (2001). The determinant of crime in South Africa. *South Africa Journal of Economics,* 69(2), 269-298.

Chigunta, F. (2002). Youth entrepreneurship: Meeting the key policy challenges [Online]. Available: http://www.bg.entrep.ta (04 June 2009).

Cooper, D.R. & Schindler, P.S. (2003). *Business Research Methods*. New York: McGraw Hill Inc.

Ehlers, T., & Lazenby, K. (2007). *Strategic management. South Africa concepts and cases*. Pretoria: Van Schaik.

Government Gazette. (2008). National youth Policy 2008-2013. [Online]. Available: http://www.pmg.org.za/files (31 July 2009).

Henley, A. (2007). From entrepreneurial aspiration and transition to business start up: evidence from British longitudinal data. *Entrepreneurship and Regional Development,* 19(3), 253-280.

Herrington, M., & Wood, E. (2003). Global Entrepreneurship Monitor, South African Report [Online]. Available: http://www.gbs.nct.ac.za/gbswebb/userfiles/gemsouthafrica2000pdf (5 May 2009).

Herrington, M. Kew, J., & Kew, P. (2009). Tracking entrepreneurship in South Africa: a GEM perspective [Online]. Available: http//www.gemconsortium.org/article (6 September 2010).

Kazela, N. (2009). The Roadmap of Youth Entrepreneurship (MDGs) [Online]. Available: http://www.wcf2009.org/program (20 September 2009).

Leech, N.L., Barrett, K.C. & Morgan, G.A. (2005). *SPSS for intermediate statistics, use and interpretation*. New Jersey: Lawrence Erlbaum Associates Inc.

Lefebvre, E., & Lefebvre, L. A. (2002). Determinant of export performance and behaviour: A longitudinal study of manufacturing SMEs in Kleinknecht. *Econometric Explorations of Survey Data*, 5(1), 281-309.

Maas, G., & Herrington, M. (2006). The Global Entrepreneurship Monitor (GEM) South African Report [Online]. Available: http://budgetspeechcompetition.co.za (29 June 2009).

Mollentz, J. (2002). Creating conducive policy environment for employment creation in SMEs in South Africa [Online]. Available: http://www.unido.org/ (August 23, 2010).

Mutezo, A. T. (2005). Obstacles in the access to SMME finance: an empirical perspective of Tshwane. Unpublished Masters Dissertation, University of South Africa.

Ndhlovu, S., & Twala, W. D. (2007). Financial needs of small and medium scale contractors in South Africa [Online]. Available: http://www.cib2007.com/papers (September 7, 2009).

Orford, J. Wood, E. Fischer, C. Herrington, M. and Segal, N. 2003. South African executive report [Online]. Available: http://www.gemconsortium.org/articles (July 12, 2010).

Peterman, N. E., & Kennedy, J. (2003). Enterprise Education: Influencing Students' Perceptions of Entrepreneurship. *Entrepreneurship Theory and Practice*, 28(2), 129-144.

Pihie, Z. A. L. (2009). Entrepreneurship as a career choice: An analysis of entrepreneurial self efficacy and intention of university students. *European Journal of Social Sciences*. 9(2), 338-349.

Pretorius, M., & Shaw, G. (2004). Business plan in bank-decision making when financing new ventures in South Africa. *South African Journal of Economics and Management Science 7(2), 221-242.*

Robertson, M., Collins, A., Medeira, N., & Slatter, J. (2003). Barriers to start up and their effect on aspirant entrepreneurs. *Education + Training*, 5(6), 308-316.

Raosoft. (2009). Sample size calculation. [Online]. Available:http://www.ezsurvey.com/samplesize (June 10, 2009).

Rwigema & Venter. (2004). Advanced entrepreneurship. *Advanced Entrepreneurship.* Cape Town: Oxford University Press Southern Africa.

Sathiabama, K. (2010). Rural women empowerment and entrepreneurship development [Online]. Available: http://www.microfinancegateway.org/ga (August 15, 2010].

Shapero, A., & Sokol, L. (1982). The social dimensions of entrepreneurship. *Encyclopaedia of Entrepreneurship*, 72-90.

South African Police Service Crime Statistics. (2009). Crime statistics [On line]. Available: http://www.saps.co.za (August 17, 2010).

Statistics South Africa. (2010). Quarterly Labour Force Survey: Quarter 2 (April to June). [On line]. Available: http://www.infor.gov.za/speech   (September 17, 2010).

Umsobomvu Youth Fund. (2008). Investing in sustainable livelihoods [Online]. Available: http://www.youthportal.org.za/ur. (July 18, 2009).

Vesalainen, J., & Pihkala, T. (2000). Entrepreneurial identity, intentions and the effect of the push-factor. *International Journal of Entrepreneurship*, 3(2), 145-151.

Von Broembsen, M., Wood, E., & Herrington, M. (2005). *Global Entrepreneurship Monitor South Africa report.* [Online]. Available:http://www.gsb.uct.ac.za/gsbwebb/userfiles/gem2005.pdf (September 16, 2009).

Wong, M Choo, S. (2009). Entrepreneurial intention: Triggers and barriers to new venture creation in Singapore. *Singapore Management Review*, 28(2), 47-64.

Table 1. Obstacles to youth entrepreneurial intention

	University		High school	
Items	Mean	Standard deviation	Mean	Standard deviation
Lack of information	4.61	0.936	4.14	0.911
Lack of skills	3.41	0.904	3.79	0.987
Difficult bank finance	4.70	0.874	4.20	0.868
Can't write business plan	4.23	0.923	3.89	0.888
No family member did it	2.05	0.670	1.06	0.523
Fear of crime	4.89	0.884	4.51	0.914
No opportunity in the market	3.66	0.710	3.63	0.605
Future uncertainty	2.08	0.629	3.04	0.664
Repaying school loans	3.83	0.836	1.03	0.552
Right partner difficulty	1.02	0.555	1.79	0.525
Weak economic environment	3.44	0.634	3.36	0.603
Lack of funding information	4.31	0.799	3.78	0.671
Lack of savings	4.90	0.961	4.79	0.834
Lack of family and friends support	3.33	0.737	1.98	0.673
Lack of collateral	4.75	0.862	3.79	0.775
No one helping	1.79	0.639	2.03	0.625
Lack of business experience	4.39	0.884	3.72	0.894
Fear of risk	2.58	0.718	3.66	0.922
No people encouraging	1.93	0.680	2.55	0.793
No management and entrepreneurial knowledge	3.57	0.816	3.68	0.980
High registration costs	3.36	0.611	3.44	0.733
Don't have a good idea	3.75	0.847	4.96	0.918
Don't have the right contacts	3.50	0.810	3.81	0.771
Not the right time for me, want to do other things first	3.89	0.648	4.20	0.982
I am too young	2.74	0.542	3.98	0.621
Involves too much work and effort	2.79	0533	3.44	0.658

Table 2. Rotated factor matrix for obstacles (university students)

Factors	1 Capital	2 Skill	3 Support	4 Market opportunities	5 Risk
Lack of savings	0.91				
Lack of collateral	0.85				
Difficulty in obtaining bank finance	0.71				
Repaying school loans	0.64				
High registration costs	0.52				
Lack of information		0.89			
Lack of business experience		0.82			
Can't write business plan		0.71			
No management and entrepreneurial knowledge		0.64			
Don't have a good idea		0.61			
Lack of skills		0.57			
Lack of funding information			0.79		
Don't have the right contacts			0.64		
Lack of family and friends support			0.61		
No opportunity in the market				0.64	
Weak economic environment				0.51	
Fear of crime					0.87
Not the right time for me, want to do other things first					0.68
Involves too much work and effort					0.63
Fear of risk					0.59
Future uncertainty					0.55
I am too young					0.51
Eigenvalue	16.76	9.49	6.26	4.38	3.50
Percentage of variance explained	41.02	15.07	12.70	8.38	4.51
Cronbach's apha	0.861	0.730	0.711	0.807	0.820

Factor loading less than 0.300 have been omitted.

Table 3. Rotated factor matrix for obstacles (high school students)

Factors	1 Capital	2 Skill	3 Risk	4 Support	5 Market opportunities
Lack of savings	0.98				
Lack of collateral	0.71				
Difficult bank finance	0.67				
High registration costs	0.51				
Don't have a good idea		0.81			
Can't write business plan		0.79			
Lack of skills		0.76			
Lack of business experience		0.72			
No management and entrepreneurial knowledge		0.61			
Lack of information		0.55			
Not the right time for me, want to do other things first			0.78		
Fear of crime			0.73		
I am too young			0.69		
Fear of risk			0.62		
Involves too much work and effort			0.55		
Future uncertainty			0.53		
Don't have the right contacts				0.72	
Lack of funding information				0.65	
No opportunity in the market					0.74
Weak economic environment					0.65
Eigenvalue	15.223	4.502	2.926	2.774	2.971
Percentage of variance explained	32.23	12.81	15.06	14.91	12.04
Cronbach's alpha	0.844	0.812	0.807	0.792	0.518

Factor loading less than 0.300 have been omitted.

Table 4. T-test for the differences in the mean scores of university students and high school students

Factor	Scale means for university	Scale means for high school	t-test significance
Capital	4.31	4.05	0.15
Skill	3.99	4.03	0.12
Support	3.71	3.80	0.31
Market	3.55	3.50	0.42
Risk	3.16	3.81	0.11

A Technological Innovation Management Based on the Audit

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Abstract

This paper analyzes the status of technological innovation management, made a complete concept of technological innovation audit, and sets up a conceptual model of technical innovation audit using systems engineering method. We puts forward an integrity concept of stakeholders at all levels, established a concept model of technological innovation audit and presents the workflow and common method of implementing technological innovation audit.

Keywords: Technological innovation audit, Technological innovation management, Stakeholders

1. The concept of technological innovation management

Since 90s of 20th century, global competition is mainly reflected in the strength of economic and technological competition, and technological innovation is increasingly becoming the promotion of economic development and the key of technological progress. More and more companies find that only with good quality, a sufficiently high efficiency, flexible organizational structure can not meet the requirements to remain competitive. They will pay more attention to the effective management of technological innovation.

Technological innovation management is for the allocation of resources in technological innovation process, including technical origin R & D), technology (including designing, manufacturing, sales and service of commercial, industrial processes) and other processes. Technological innovation management has gone through the individual innovation management stage, organizational innovation management stage and comprehensive management stage. The late 20th century, technological innovation management has entered the era of comprehensive management.

2. The concept of technical innovation audit

Technological innovation audit is an important breakthrough in technological innovation management practices. Technical Innovation Audit Committee who base on certain procedures and methods and combine with audit and technical innovation, take technological innovation as the main audit object, identify problems and propose solutions to improve the quality of management in order to promote the performance's improvement.

As a dynamic flow of the loop, technical innovation audit include three stages, there are audit of the core business, the auxiliary system audit, security audit.

3. Technological innovation stakeholders

The survival and development of enterprise is inseparable from all aspects of the relationship which can be summarized in several categories of stakeholders constituting the main users' groups of technological innovation audit. They include the government (providing innovation funds and the administrative supervision), banks (providing credit loans), VC (providing venture capital) and the owners. (Figure 1)

Innovation fund for technology based firms is a special government fund set up upon the approval of the State Council. In recent five years, there were 4676 projects subsidized which include 326 terminated projects. The project was unable to carry out accounts for 46%, fell behind 20.9% seriously; the enterprise is unable to relate accounts for 15%. Therefore, the country need the technological innovation audit display function to strengthen the technological innovation management and forms a good investment guidance system.

The bank through provide unsecured loan becomes enterprise's creditor. Whether take back the loan relates to the bank's stable and the sustainable development. Former loan origination judge by enterprise and bank cooperation, but the technological innovation enterprise has the high risk with high repayment. Finding the high quality property and the potential enterprise in many mortgage applications becomes one of banking industry's key goals.

VC pursues exceed profit, they are finding the potential enterprise, infused the fund to them and participate in their management and operation. How to find the best one is the problem. Technological innovation audit is one kind of quite feasible management tool.

The owner, including the shareholders and the investors in capital market, are company's creditors. They always lack of the experience to the management and need technological innovation report to tell them how the company operates, what is the investment rate and so on.

4. Technological innovation audit model

According to the auditing theory, the technological innovation audit model has included the audit stakeholders, the audit object, the audit team and the audit content and so on several factors. (Figure 2)

4.1 Technological innovation audit's object and content

Technological innovation audit's object includes the basic process and the auxiliary system. (Table 1)

Basic process is the core process of technological innovation audit, it is the scientific assessment. In this process, we analyze the differences between existing one and optimization one, give the audit report according to the enterprise's goal. We can help the enterprise find business process which matches the core goal, which need improvement, and help they understand who is able to provide methods and how to improve.

Auxiliary system is the audit function in the combination with management. Including surveillance, coordinated, control and so on managed capacity appraisals and resources supplies, strategic plan, environment and so on overall quality examination. Auxiliary system is composed of the following basic audit content: first, whether is enterprise resources possible arrangement? Second, whether the administrative management does achieve the modern management requirements? Third, whether the professionals have the enough knowledge? Whether the enterprise has the enough technical personnel?

4.2 Technological innovation audit's team

The technological innovation audit implements by the special independent auditors, involves the technical research and development, the examination, human resources management, the financial control, the market analysis, even includes the service movement, the production operation, the achievement transformation and so on various work, is high to the auditors' overall quality request.

Overall speaking, corporate management level does not have the qualifications of technological innovation audit; it does not conform to the non-independent third party principle.

5. The workflow

5.1 plan technological innovation audit work

The plan technological innovation audit work's goal is understood that enterprise's present situation, the definition technological innovation audit's goal, distinguishes each kind of disadvantage factor, the formulation technological innovation audit overall strategy and the concrete technological innovation audit plan, confirmed that the technological innovation audit the indicator system, is clear about the technological innovation audit method, the hypothesis audit important level and so on.

5.2 collect audit's evidence

The technological innovation audit evidence is to draw the audit conclusion, to form all information which the audit

opinion uses. We act according to the technological innovation audit objective and the technological innovation audit plan, collection enough suitable technological innovation audit evidence in order to give audit opinion. The data may through the questionnaire survey, the observation, the inquiry, the letter card, test the record; inquire collections related to ERP system.

5.3 carry on the technological innovation audit sampling

Along with enterprise size's expansion and information system's consummation, the enterprise has, the complex data massively in the technological innovation process, thus causes to each data to carry on the technological innovation audit becomes is already impossible not to be unnecessary.

Gaining the highly effective accurate evidence and forming the reasonable conclusion needs the technological innovation auditors which accord to the technological innovation audit objective and the related heavy blunder newspaper risk, carry on the technological innovation audit sampling. And then we can analyze the result and give the improvement.

5.4 form the audit report

Through to the evidence collection, the reorganization, the analysis, the expert unifies enterprise's goal and the technological innovation market analysis, gives reasonably, the fair and just technological innovation audit conclusion. After the technological innovation report of audit proposes, the expert to the related material risk, the major impact factor and the related department and the personnel will carry on the transportation and the communication, and will supervise to carry out the improve plan. A technological innovation audit work by no means isolated stage, but passes through the process which enterprise technological innovation throughout continues, to revise unceasingly.

6. Technological innovation audit method

6.1 survey forms

The survey form law is the question which and needs to understand according to the technological innovation audit work's goal, designs the corresponding form, distributes for is solicited by the technological innovation auditors the opinion the method. The survey form law has the technological innovation audit purpose to determine that the tabulation project standard, the essential control point arrange in order the item, easy to judge the choice separately the characteristic. Fills out a form may when the discussion by technological innovation auditors scene filling, may also distribute to the staff fills, special details according to technological innovation audit important level determination.

6.2 flow chart

The flow chart is flows through a system's information flow, the viewpoint class or part class graph representative. The flow chart mainly uses for to show some process. This kind of process already may be on production line's technical process, may also completes a duty essential management process. Its merit is (1) based on the system determined that the division of labor (2) marks the division of labor limits control (3) the graphical representation to conform to the engagement standard (4) flow line clear Yi Jian (5) the record to be clear.

6.3 statistical evaluations

The statistical evaluation may use in discovering between each data to cancel checks the relations, the latent technological innovation audit risk. Simple statistical evaluation tool like EXCEL and so on may use for to analyze the identical production cycle enterprise technological innovation situation and the competitor fit and unfit quality.

6.4 analysis procedural laws

The analysis program is refers to the technological innovation auditors through between the research different data between as well as each different categorical data intrinsic relations, makes the appraisal to the evidence. The analysis program also includes the investigation recognition to have the information inconsistent or with the anticipatory data serious deviation fluctuation reason.

7. Conclusions

To the technological innovation implementation audit, needs us to the divergent interest counterparts' request and enterprise's characteristic, conducts the concrete research, must pay attention to the indicator system establishment specially the rationality, this will be a present technological innovation auditing research important topic.

References

Vittorio,Chiesa,Paul,Coughlan,and Chris,A,Voss.(1996).Development of a Technical Innovation Audit. *Journal of*

Product Innovation Managemene, 13,105-136.

Adler, Paul, S, McDonald, D, William and Macdonald,Fred.(1992).Strategic Management of Technical Functions.*Sloan Management Review*,winter,19-37.

OECD & EUROSTAT. (1997). *Oslo Manual.*Paris: OECO Publishing, (Chapter 2).

Elenkov,D. (2002).Effects of leadership on organizational performance in Russian companies.*Journal of Business Research*.55,467-480.

Powell, W, W, Koput K and Smith-Doerr L Interorganizational collaborations and the locus of innovation: Networks of learning in biotechnology. (1996). *Administrative Science.* Quarterly, 116-145.

Table 1. The audit shareholder and content and object.

| content and content (shareholder)		innovation funds	supervision	Bank	VC	owner	manager
Basic process	Technological innovation plan	√	√		√		√
	Initiating a project			√	√	√	√
	Technological innovation practice				√	√	√
	Technological innovation examination	√			√		√
	Technological innovation marketability		√		√	√	√
Auxiliary system	Resources supplies			√	√	√	√
	Environment		√				√
	Surveillance and appraisal	√	√		√	√	√
	Coordinated and communication	√			√		√
	Control	√			√		√
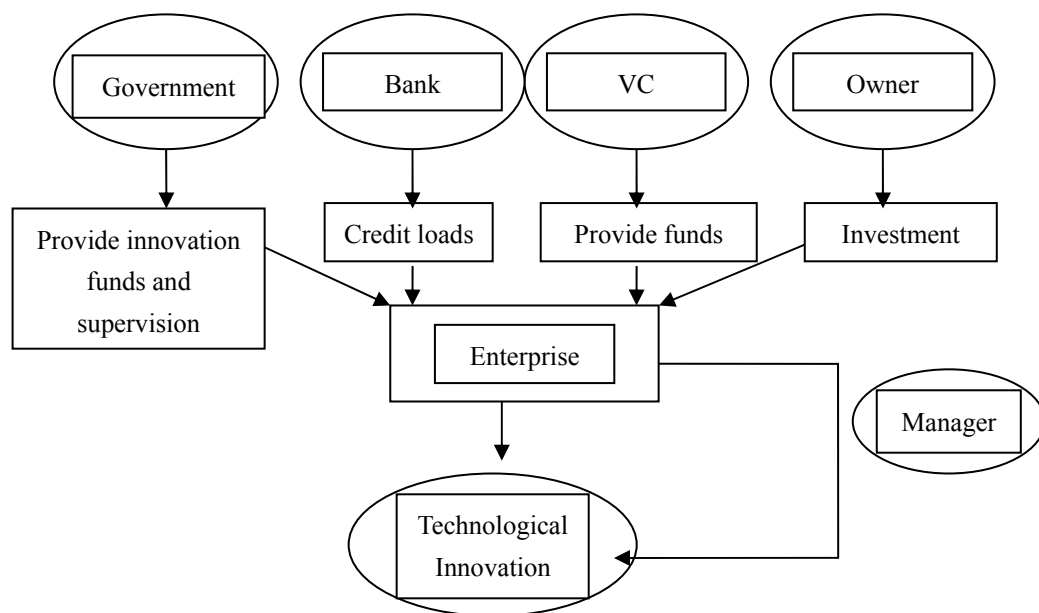
Figure 1. Technological Innovation Stakeholders
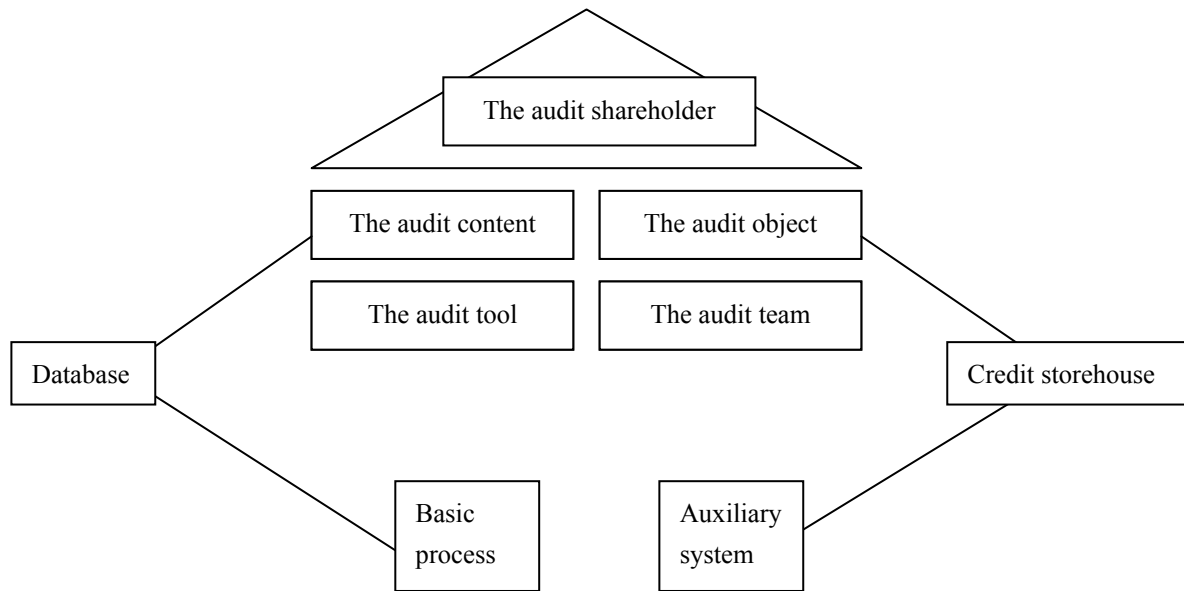
Figure 2. Technological Innovation Audit Model

A Cross-Cultural Comparison by Individualism/Collectivism among Brazil, Russia, India and China

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Abstract

By 2039, the economics of BRIC (Brazil,Russia,India and China) will overtake and be wealthier than most of the current major economic countries, such as the G6, and the combined economics of the BRIC will eclipse the current richest countries and play a major role in the global economy. Despite the enthusiasm for increased global interaction and economic exchange, many people have found that cultural differences have hindered their ability to efficiently conduct business due to their lack of understanding of the cultural differences.

This research explores the comparison of cultural orientation. The individualistic-collectivist characteristic was a dependent variable, and the four distinct geographic regions were independent variables. The objectives provide a more comprehensive understanding of the differences and similarities of culture among Brazil, Russia, India and China. The SPSS 13.0 was utilized for the data analysis of the collected surveys for measuring the research hypothesis. The findings were a statistically significant difference between the individualist/collectivist attitudes among the BRIC.

Keywords: BRIC, Cross Culture, Individualism, Collectivism

1. Introduction and background

By 2039, the economics of BRIC (Brazil, Russia, India and China) will overtake and be wealthier than most of the current major economic countries, such as the G6 (Goldman Sachs, 2003), and the combined economics of the BRIC will eclipse the current richest countries and play a major economic role in the world (Braun, 2009; MacDonald, 2009).

The BRIC was first coined and prominently called by Jim O'Neill, one of global economists at Goldman Sachs, in 2001 for four fast-growing developing countries. The BRIC encompass over 25% of the world's land coverage and 40% of the world's population. Wu and Lin (2008) indicated that the BRIC has three common characteristics including abundant natural resources, young population and extensive land areas that will affect profoundly on the global economy. Goldman Sachs (2003) predicts that China and India will be the dominant global suppliers of manufactured goods and services while Brazil and Russia will also become similarly dominant as suppliers of raw materials respectively, and cooperation is hypothesized to be a logical next step among the BRIC because Brazil and Russia will become the logical commodity suppliers to India and China.

World Bank (2009) indicated that the GDP of the BRIC in 2008 amounts to $8.3 trillion, of which China's GDP totals to 46.5 percent or $3.86 trillion, and that of Russia, Brazil and India for 19.4 percent or $1.61 trillion, 19.4 percent or $1.61 trillion and 14.7 percent or $1.22 trillion, respectively. The four countries rise is due to their actual

economic growth rate in 2008, which was much higher than other countries, and the GDP compared with 2007, China jumped from 4th to 3rd, while Brazil from 10th to 8th, Russia rose 11th to 9th, and India remained in 12th place (World Bank, 2009).

According to Taiwan's Ministry of Economic Affairs (MOEA), that country's major national trading partners include the China, India, Russia and Brazil. From January to August 2009, Taiwan traded with the China $46,957 million worth of goods and services (representing about 20.41 percent, ranking the China as Taiwan's first largest trading partner); traded with India total U.S. $2,545 million (representing about 1.10 percent, and ranking India as the 17th largest trading partner); traded with Russia total U.S. $1,712 million (representing about 0.74 percent, and ranking Russia as the 22nd largest trading partner); and traded with Brazil total U.S. $1,646 million (representing about 0.71 percent, and ranking Brazil as the 24th largest trading partner).

Goldman Sachs (2003) indicated that the BRIC makes it relatively easy for their aggregate wealth, and this phenomenon will affect world markets that multinational corporations will attempt to take advantage of the enormous potential markets in the BRIC by producing. Globalization and economic openness have contributed to increased international engagement of countries in business interaction in the 21st century. Both foreign investment and international trade are growing substantially, causing increasing interdependence of national economies as well as furthering the globalization of companies.

Presently, BRIC economy has an enormous influence in the world; therefore, it is imperative to understand the various cultural issues that may influence behaviors. Different countries and different regions have different cultures, so there is a need to understand the impact of cultures on international communications. The competing evaluations of the regions also highlight the role of ethnic and cultural influences in the development of business climates.

The purpose of the study is to compare the cultural differences and similarities of Brazil, Russia, India and China. An understanding of these different evolutions will help individuals adjust their strategies when conducting business in these areas. The study is imperative in that the BRIC and the international community need to make genuine strides in learning about each others. Within this increasing global economic interdependence, the topic has been identified as an area requiring further inquiry.

2. Review of the Literature

Brazil was a former colony of Portugal from the 16th to the 19th centuries. Jain (2006) indicated that Brazilian is quite capable of doing business employing the North American, Northwestern and Central European process of business negotiation. As a former colony of British in the 18th century, Indian government, financial and legal systems have developed and closely linked to the British (Jain, 2006). Since the Russian Revolution in 1917, Russian was a country of Socialism and Communistm. Jain (2006) announced that the country, Russia, presently in a transition to a free market economy and a democratic form of government, and the structures of contractual obligations and accepted business processes are being created. After the October Revolution in Russia in 1917, The Marxist-Leninist doctrine spread among Mainland China's working class, which led to the founding of the Chinese Communist Party (CCP) in 1921 ("Party to", 2001). In recent history, China has been separated politically and economically, which has had a great influence on the development of the business climate of each area. Presently, China and Japan share many concepts of culture, philosophy and religion that are distinctly different from western countries (Jain, 2006). Although different culture influences Brazil, Russia, India and China respectively, each has also developed unique culture and practices relating to international business and negotiating process.

Culture is commonly defined as "a set of shared values and beliefs that characterize national, ethnic, moral and other group behavior "(Faure and Sjostedt 1993; Craig and Douglas 2006; Adapa 2008). Culture also refers to individual cultures revealed through the food, songs, and stories that are exchanged with people outside of that region (Parra 2001). One further definition of culture is a pattern of shared basic assumptions that a group learned as it solved its problems of external adaptation and internal integration that has worked well enough to be considered valid, and therefore to be taught to new members as the appropriate ways to perceive, think, and feel with relation to those problems (Schein 1997). Simintiras and Thomas (1998) defined culture as "accepted values and norms that influence the way in which people think, feel, and behave." Barbash and Taylor (1997) indicated that culture includes religion, gender, language, class, ethnicity, and sexual orientation. Since sub-cultures, cultures and super-cultures merge and evolve, while being less bounded than before; the idea of culture is more porous and varied than before (Barbash and Taylor 1997). Lee and Trim (2008) indicated that a shared organizational culture can help with the management of an international partnership arrangement, and senior managers will need to possess knowledge of the national cultural value traits of the people concerned.

Culture is defined as a pattern of shared basic assumptions of a society according to national, organizational, regional, ethical, religious, linguistic, and social characteristics (Chen and Staroata, 1998). Van (2009) defined

culture is as a group-level phenomenon in which beliefs, values, and beliefs, all of which impact business processes and decision-making. Culture affects the strategies that negotiators develop as well as the tactics employment (Salacuse, 1995). Each negotiator's individual culture determines his or her epistemology, values, norms and behaviors (Simintiras and Thomas 1998; Hung 1998; Woo and Pru'homme 1999; Chang 2003). D'Andrade (1984) presents a slightly more comprehensive interpretation of culture:

Learned systems of meaning, communicated by means of natural language and other symbol systems…capable of creating cultural entities and particular senses of reality. Through these systems of meaning, groups of people adapt to their environment and structure interpersonal activities…. Cultural systems can be defined as a very large diverse pool of knowledge, or shared clusters of norms, or subjectively shared, symbolically created realities. (p. 116)

Barbash and Taylor (1997) indicated that culture includes religion, gender, language, class, ethnicity, and sexual orientation. Since sub-cultures, cultures and super-cultures merge and evolve, while being less bounded than before, the idea of culture is more porous and varied than before (Barbash & Taylor, 1997). In order to understand different cultures, Chu (1974) provided six suggestions to assist researchers investigating other cultures:

(a) beware of stereotyped views of foreign people, (b) see the common humanity of people amidst cultural diversities in the world, (c) recognize a different scale of value in a non-Western society, (d) develop human empathy and active concern for other people, (e) discern the inter-relationship between language and culture, and (f) study non-Western cultures for their intrinsic worth and thus see the richness. (p. 51)

Different cultures can generate distinct negotiation styles and perception (Van, 2009; Gulbro and Herbig, 1994). Culture may influence how negotiators conceive and function of negotiation (Guo, Lin and Wang, 2008). Differences in negotiating styles originate from the fact that every society places different degrees of importance on "relationship development, negotiating strategies, decision making methods, spatial and temporal orientations, contracting practices, and illicit behaviors such as bribery" (Acuff 1997: 19). These different styles in negotiation are the result of differences in communication, protocols, persuasion strategies, and personal characteristics, including accommodation, determination, flexibility, and adaptation (Hung 1998).

Cross-cultural negotiations are more complex than mono-cultural due to cultural factors, environments, languages, ideologies, and customs (Woo, 1999; Mintu-Wimsatt and Gassenheimer 2000; Hoffmann 2001). Because many negotiators may lack understanding of these cross cultural differences, they are often unsuccessful at reaching an agreement. Cultural aspects can be more of an obstacle than economic or legal factors (Gulbro and Herbig 1995). A successful cross-cultural negotiation requires the skill of selecting the appropriate communication strategy and tactics. Successful negotiation requires not only acquiring technical communicative abilities, but also an understanding of the context of the negotiation by both parties (Korobkin 2000).

Numerous studies have shown that culture is one of most important factors in cross-country negotiations (Salacuse 2005). An understanding of the differences and similarities of each culture by the negotiators is beneficial in facilitating communication and success in negotiation (Gannon 2001). When attempting cross-culture negotiations, the representatives need to be aware of and familiar with the different behaviors of representatives from other countries (Gulbro and Herbig 1999). During these negotiations, both parties must often change their tactics to meet the other party's style. Gulbro and Herbig (1995: 3) also indicated "when negotiating internationally, this translates into anticipating culturally related ideas that are most likely to be understood by a person of a given culture".

With the goal of helping individuals distinguish the various cultural differences of countries, Hofstede (1980) introduced his seminal theory of four cultural dimensions based on his earlier qualitative, phenomenological studies. This theory identifies four major cultural differences: power, uncertainty/avoidance, collectivism characteristics, and masculinity/femininity (Hofstede 1980 and 1994). Hofstede's major proposition is that cultural differences impact business conduct, decision making and communication. Therefore, increased cultural awareness is important for international managers (Chang 2003). Hofstede and Bond (1988) added a fifth dimension to the cultural dimension model, which they identified as "Confucian dynamism," to distinguish between Chinese and Western cultural values. The five cultural dimensions were defined by Barry (2001: 35) as:

Power difference is the perceived degree of inequality among people. Uncertainty avoidance is the extent to which a society feels threatened by uncertain situations and avoids these situations by providing stable systems with formal rules. collectivism characteristics are a social fabric in which each individual takes care of himself or herself in contrast with collectivism in which groups take care of the individual. Masculinity-Femininity reflects on whether the dominant values that are associated with the collection of money and things (masculinity) as contrasted with values associated with caring for others and quality of life (femininity). Confucian dynamism reflects whether the members of a society are short-term or long-term oriented in outlook.

3. Research Methodology

The study employed a non-experimental, quantitative research design to analyze cultural differences. The research design was used causal-comparative (exploratory) and correlational (explanatory), and was intended to examine the cultural differences in the distinct geographic regions of Brazil, Russia, India and China. The individualistic-collectivist characteristic was a dependent variable, and the four distinct geographic regions were independent variables. The objectives will provide a more comprehensive understanding of the differences and similarities of culture in Brazil,Russia,India and China.

Since the 1990s, the use of the quantitative method has become more and more common (Giovannini, MacDiarmid, Calistri, & Conte, 2004). Below are several advantages that quantitative methodology offered this study: (a) A quantitative approach has the advantage of being able to compare and contrast between cultures through different organizations (Cabrera, & Bonache, 1999); (b) The quantitative approach takes studies from longitudinal research then applied them to cross-sectional research, and defined relationships between dependent and independent variables within the population(Richards, 2001); (c) This method has the ability to predict, and produce clearer, more conclusive results for the causal observer (Labaree, 2003); (d) The quantitative method has an advantage when studies are done over a large population (Sameer, Jasmine, & Ron, 1996). The results provide a way to generalize for the survey population (Richards, 2001; Chapman, Coll, & Meech, 1999).

The primary purpose of the study is to provide a more comprehensive understanding of the differences and similarities culture in Brazil, Russia, India and China. Therefore, the target population was the people who are presently working in public companies in Brazil, Russia, India and China. For this study, the accessible population was chosen from public companies listed under the Rio de Janeiro Stock Exchange and Sao Paulo Stock Exchange in Brazil, Russian Trading System Stock exchange (RTS Exchange), National Stock Exchange of India and Bombay Stock Exchange in India and Shenzhen Stock Exchange (SSE) and Shanghai Stock Exchange in China. Any companies listed on these markets had the potential to be included in this study. The research hypothesis in the study is "There is a significant difference of individualism/collectivism among CEOs, sale and purchasing managers from public companies in Brazil, Russia, India and China".

To ensure the instrument's reliability, the questionnaire was translated by the Asian Translation Link Company into Portuguese, Russian, Hindi and simplified Chinese then certified by the Translation & Attestation Association. Five versions of the survey were produced--the Portuguese version, Russian version, Hindi version, simplified Chinese version, and the English version were posted on the research website. When responding, participants selected the version that they prefer to use.

This study employed stratified random sampling, a probability-sampling plan, to select a representative research sample. In the research, data was collected using an online survey technique. Each company's CEOs and sales and purchase managers were randomly selected from listed companies of stock markets in Brazil, Russia, India and China. All information, such as the names of CEOs and sales and purchase managers, and e-mail addresses of listed companies were obtained through the website of the Rio de Janeiro Stock Exchange and Sao Paulo Stock Exchange in Brazil, Russian Trading System Stock exchange (RTS Exchange), National Stock Exchange of India and Bombay Stock Exchange in India and Shenzhen Stock Exchange (SSE) and Shanghai Stock Exchange in China. The survey was accessible on the Internet without direct contact with the researcher.

The CEOs and sales and purchase managers of the sample population were invited to participate via an e-mail that explained the research and included a link to the survey website. The questionnaire was posted on the website, "www.my3q.com" in English and traditional Chinese versions. The researcher asked respondents to return the surveys within 30 days by sending an e-mail to "www.my3q.com" website. Upon agreeing to participate in the study, the participants received a password provided by my3q.com to prevent unauthorized people from filling out the questionnaire. Participants were asked not to re-submit the questionnaire. For higher returning rate of online survey, therefore, a snowball sampling method was also used to recruit eligible participants from a diversity of community sites to ensure a large enough number of online survey responses were obtained. In this procedure, an invitation e-mail sent to CEOs and sales and purchase managers of public companies with the request that the e-mail be passed along to additional eligible participants (e.g., business partners, and colleagues).

The Statistics Package of Social Science (SPSS) for Windows version 13.0 was utilized for the data analysis of the collected surveys. Frequency distributions were used to illustrate socio-demographic characteristics such as gender, education and regions of birth of participants. For Research hypothesis, an one-way ANOVA was conducted to investigate individualism/collectivism degree in Brazil,Russia,India and China.

4. Data Analysis and Results

In this study, 2,400 invitations were e-mailed to public companies' CEOs and sales and purchase managers in Brazil, Russia, India and China by a stratified probability sampling plan. Overall, this method for determining a sample

population is more accurate than purely random sampling, further it allows the researcher to select a sample that accurately reflects the diverse sectors and characteristic patterns in the desired population (Wallen & Fraenkel, 2001). This research method is useful in that it allows a small but carefully selected data pool to provide insight into the more general trends of a larger population. The principal characteristic of probability sampling is that every member or individual has an equal probability of being selected from the population as the sample (Ary et al., 1996). This is also the reason why the researcher used a probability-sampling plan in this study that allowed, through use of inferential statistics, the researcher to evaluate the extent to which the findings were likely to be different from what they would have been as a result of investigating the whole population (Ary et al., 1996).

A hyper-link to the survey web site was provided on each invitation e-mail. Participants who chose to take part in the study were directed to the survey. All questionnaires were coded for statistical analysis with the SPSS computer software program. Data collection lasted for one month, and 569 questionnaires were returned. However, 16 questionnaires were incomplete or invalid. There were 140 usable questionnaires from Brazil, 147 usable questionnaires from Russia, 136 usable questionnaires from India and 130 from China as shown in Table 2.

Cronbach's coefficient a was used to analyze variables that are composed of several scale items. In this study, the internal consistency reliability was measured by using Cronbach's coefficient a according to the mean or average correlation of each item with every other item. The questionnaire was developed in 2005 by Tu, and revised in 2009. The Cronbach's a value for individualistic-collectivist characteristic was 0.81, and there are 5 questions for the part. For higher Cronbach's coefficient a, the value was re-conducted for the internal consistency reliability before doing the research. The Cronbach's a value was 0.92, and become 3 questions.

Among the 553 respondents, 326 (59.0%) were male and 227 (41.0%) were female. In this study, 51 respondents (9.2%) held a High School Diploma or equivalent; 40 respondents (7.2%) held a Associate's Degree; 274 respondents (49.5%) were college or university graduates; and 188 respondents (34.0%) had a graduate degree. In this study, 177 (32.0%) earned an annual income of less than US $35,000. There were 155 (28.0%) who earned from US $35,001 to $50,000; 164 (29.7%) who earned from US $50,001 to $65,000; and 57 (10.3%) who earned more than US $65,000. In terms of religion, 327 respondents (59.1%) were Buddhist; 140 (25.3%) were Christian; 27 (4.9%) were Muslim; and 59 (10.7%) were others. There were 117 (21.2%) respondents under 35 years old; 182 (32.9%) between 35 and 45 years old; 155 (28.0%) from 46 to 55 years old; and 99 (17.9%) who were older than 55. The frequency distribution of respondents is shown in Table 2.

An ANOVA was conducted to investigate individualism/collectivism degree in Brazil,Russia,India and China. A statistically significant difference was found in Individualism/ Collectivism among four regions, $F_{(3, 549)} = 29.770$, $p = .000$ as shown in Table 3. As shown in Table 4, a multiple comparisons of Post Hoc Tests showed that there was a significant difference between Brazil and India, and the mean difference was -.382, and there was a significant difference between Brazil and China, and the mean difference was .422. There was a significant difference between Russia and India, and the mean difference was -.492, and there was a significant difference between Russia and China, and the mean difference was .312. More over, there was a significant difference between India and China, and the mean difference was .804.

5. Discussion

There was a statistically significant difference between the individualist/collectivist attitude among Brazil,Russia,India and China. The descriptive statistics of socio-demographic factors in this research were consistent with the latest population statistics by public companies. Hence, this study can properly represent all public companies in Brazil,Russia,India and China.

The results showed that there was a significant difference among Brazil,Russia,India and China in individualism/collectivism attitude. It indicates that India has highest individualism attitude compared to Brazil,Russia and China. China has highest collectivism attitude compared to Brazil, Russia and India. Brazil has higher individualism attitude compared to China. Those results of the study were consistent with the findings of the prior empirical study by Hofstede (1980). From the Table 4, it also announces Russia has higher individualism attitude compared to China, and both Brazil and Russia have no significant differences in individualism/collectivism attitude.

Hofstede found that people from individualistic cultures tend to be more concerned with their own rights, benefits, and outcomes (Osman-Gani & Tan, 2002). From the point of view of communication, Gulbro & Herbig (1999) stated that high levels of individualism result in more time spent conducting direct communication. Hofstede found that people from collectivist cultures are typically more concerned with the group and social welfare (Osman-Gani & Tan, 2002). From the viewpoint of communication, Gulbro & Herbig (1999) indicated that high levels collectivism of will result in more time spent on indirect activities unrelated to the communication.

In the research, the participation was limited to the public companies, and selected only from public companies of CEOs, sale and purchasing managers. This study was constrained by person-power, financial resources and time; hence, the study adopted only a quantitative research method and employed a questionnaire to conduct the survey. However, the questionnaire is a self-reporting instrument. The researcher can not control the authenticity of the responses of the subjects. Hence, this study assumes that all of the respondents replied truthfully. This study was based on Hofstede's model of individualism-collectivism. Although Hofstede's model had been widely utilized to examine cultural issue, only one factor was examined in this study. Some important factors were not identified in this study, such as religion, power, uncertainty/avoidance, and masculinity/femininity.

Future studies could consider comparing different cultures to explore the differences and similarities of cultures in different countries, and are applied to other field, such as business negotiation. The future studies may employ a qualitative method to make up the insufficiencies in the quantitative method, and extend the study to other business groups to extensively investigate the influence of cultures.

References

Acuff, F. L. (1997). *How to negotiate anything with anyone anywhere around the world*, New York: AMACOM.

Adapa, S. (2008). Adoption of internet shopping: Cultural considerations in India and Australia, *Journal of Internet Banking and Commerce*, 13(2), 1-17.

Ary, D., Jacoba, L. C. & Razavier, A. (1996). *Introduction to Resaerchin Education*, 5th edition. Florida: Harcourt Brace college.

Barbash, I. & Taylor, L. (1997). *Cross-cultural filmmaking*, Berkeley and Los Angels, California: University of California Press.

Barry, S. (2001). Information sharing in global supply chain systems, *Journal of Global Information Technology Management*, 4(3), 27-50.

Braun, F. (2009). Brazil exercises the option to say "No", *The Brown Journal of World Affairs*, 15(2), 239-247.

Cabrera, E. F. & Bonache, J. (1999). An expert HR system for aligning organizational culture and strategy, *Human Resource Planning*, 22(1), 51-61.

Chang, L. C. (2003). An examination of cross-cultural negotiation: Using Hofstede framework. *Journal of American Academy of Business,* 2(2), 567-570.

Chapman, R., Coll, R. K. & Meech, K. (1999). Service quality of a cooperative education program: Employers' perspective. *Journal of Cooperative Education*, 34(1), 17-30.

Chen, G. M., & Starosta, W. J. (1998). *Foundation of intercultural communication*, MA: Allyn & Bacon.

Chu, S. K. (1997). China since 1911, *Pacific Affairs, 70*(1), 122-124.

Craig, C. S., & Douglas, S. P. (2006). Beyond national culture: implications of cultural dynamics for consumer research, *International Marketing Review,* 26(3), 322–342.

D'Andrade, R. (1965). *Cultural meaning system,* Cambridge, UK: Cambridge University Press.

Faure, G. O. & Sjostedt, G. (1993). *Culture and negotiation: An introduction*, Newbury Park: Sage Publications.

Gannon, M. J. (2001). Understanding global cultures, Newbury Park: Sage Publications, Inc.

Goldman Sachs. (2003). Dreaming with BRICs: The path to 2050, Global Economics Paper No. 99.

Girouard, R. J. (2003). Water export restrictions: A case study of WTO dispute settlement strategies and outcomes, *Georgetown International Environmental Law Review, 15*(2), 247-290.

Gulbro, R. D. & Herbig, P. (1994). The effect of external influences in the cross-cultural negotiation process. *Journal of strategic change,* 3, 329-340.

Gulbro, R. D., & Herbig, P. (1995). International negotiating behavior of small firms. *Journal of business and entrepreneurship,* 7(2), 85-91.

Gulbro, R. D. & Herbig, P. (1999). Cultural differences encountered by firms when negotiating internationally, *Industrial Management + Data Systems*, 99(2).

Guo, C., Lim, J. & Wang, F. (2008). The effect of level of negotiation support systems and cultural diversity on coalition formation: A content analysis, *Information Resources Management Journal*, 21(4), 84-97.

Hoffmann, G. (2001). When scientists or engineers negotiate, *Research Technology Management*, 44(6), 13-16.

Hofstede, G. (1980). *Culture's consequences: international differences in work-related values*, Beverly Hill: CA - Sage Publications.

Hofstede, G., & Bond, M. H. (1988). The Confucius connection: From cultural roots to economic growth, *Organizational Dynamics,* 16(4), 4-21.

Hofstede, G. (1994). *Cultures and organizations: Software of the mind: intercultural cooperation and its importance for survival*, London: Harper Collins.

Hung, C. L. (1998). Canadian business pursuits in the PRC, Hong Kong and Taiwan, and Chinese perception of Canadians as business partners, *Multinational Business Review*, 6(1), 73-83.

Jain, S. C. (2006). *Emerging economies and transformation of international business: Brazil, Russia India and China (BRICs) Northampton*, MA: Edward Elgar.

Korobkin, R. (2000). A positive theory of legal negotiation, *George Law Journal.* 88(6), 1789-1732.

Labaree, D. F. (2003). The peculiar problems of preparing educational researchers, *Educational Researcher*, 32(4), 13-22.

Lee, Y. I., & Trim, R. J. (2008). The link between cultural value systems and strategic marketing; Unlocking the mindset of Japanese and South Korean managers, *Cross Cultural Management*, 15(1), 62-88.

McDonald, R. P., & Ho, M. R. (2002). Principles and practice in reporting structural equation analyses, *Psychological Methods*, 7(1), 64-82.

Mintu-Wimsatt, A., & Gassenheimer, J. B. (2000). The moderating effects of cultural context in buyer-seller negotiation, *The Journal of Personal Selling and Sales Management*, 20(1), 1-9.

Osman-Gani, A. M., & Tan, J. S. (2002). Influence of culture on negotiation styles of Asian managers: An empirical study of major cultural/ethic group in Singapore, *Thunderbird International Business Review,* 44(6), 819-840.

Party to rejuvenate nation. (2001, July 2). *China Daily,* p. 1.

Parra, C. (2001). Political psychology: Cultural and cross-cultural foundations, *New Zealand Journal of Psychology, 30*(1), 40-43.

Richards, C. (2001). Changing with the times: Using action research to introduce IT in classroom teaching, *React*, 20(2), 7 – 16.

Salacuse, W. J. (2005). Negotiating: The top ten ways that culture can affect your negotiation, *Ivey Business Journal Online*, 1-6.

Sameer, P., Jasmine, T., & Ron, T. *The evolution of strategic quality management*, 19, 19-37

Schein, E. H. (1997). *Organizational culture and leadership*, CA: Jossey-Bass Inc.

Simintiras, A. C., & Thomas, A. H. (1998). Cross-cultural sales negotiations: A literature review and research propositions, *International Marketing Review*, 15(1), 10-36.

Tu, J. T. (2007). Impact of Culture on International Business Negotiations: A Cross-Cultural Comparison of Taiwan, Hong Kong and Mainland China. PhD diss., Lynn University.

Tu, J. T. & Farazmand, F. (2007). Impact of Culture on International Business Negotiations: A Cross-Cultural Comparison of Taiwan, Hong Kong and Mainland China. Paper presented at the Proceeding of International Conference on *Business, Management and Economics (ICBME)*, June 13–17, in Yasar University, Izmir, Turkey.

Van, D. T. T. (2009). A comparative study of Vietnamese and American customers' behavior in negotiation style and implications for global pricing strategy, *Journal of Global Business Issues*, 3(2), 25-33.

Wallen, N. E. & Fraenkel, J. R. (2001). *Educational Research: A guide to the process* (2nd ed.). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Woo, H. S. (1999). Negotiating in China: some issues for western women, *Women in Management Review*, 14, 115-20.

Woo, H. S. & Prud'homme, C. (1999). Cultural characteristics prevalent in the Chinese negotiation process, *European Business Review,* 99(5), 313-315.

World Bank (2009). Gross domestic product 2008. World Development Indicators database. [Online] Available: http://siteresources.worldbank.org/DATASTATISTICS/Resources/GDP.pdf (December 7, 2010).

Worrall, J. (2000). Tracking Track Records, *Proceedings of the Aristotelian Society Supplementary*, 74 (1), 207-35.

Wu, Y. C. & Lin, C. W. (2008). National port competitiveness: implications for India, *Management Decision*, 46(10), 1482.

Table 1. The number of respondent questionnaires in Brazil,Russia,India and China

	Brazil	Russia	India	China
Invitation E-mails sent	600	600	600	600
Respondent Questionnaires	143	151	140	135
Usable Questionnaires	140	147	136	130

Table 2. Manager Profile: Frequency Distribution of Socio-Demographic Characteristics

		Frequency	Percent
Gender	Male	326	59.0
	Female	227	41.0
Last Degree Completed	High School Diploma or Equivalent	51	9.2
	Associate's Degree	40	7.2
	Bachelor Degree	274	49.5
	Graduate Degree	188	34.0
Annual Income	Under US $35,000	177	32.0
	US $35,001-50,000	155	28.0
	US $50,001-65,000	164	29.7
	More than US $65,000	57	10.3
Religion	Buddhist	327	59.1
	Christian	140	25.3
	Muslim	27	4.9
	Other	59	10.7
Age	Under 35	117	21.2
	35-45	182	32.9
	46-55	155	28.0
	Above 55	99	17.9

Table 3. One-Way Analysis of Variance Summary Comparing Two Regions of Individualism/ Collectivism

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	44.123	3	14.708	29.770	.000
Within Groups	271.236	549	.494		
Total	315.360	552			

Table 4. Multiple Comparisons of Post Hoc Tests of Three Regions on Individualism/Collectivism

Dependent Variable	Region (I)	Region (J)	Mean Difference (I-J)	Std. Error	Sig.
Individualism /Collectivism	Brazil	Russia	.109	.08301	.629
		India	-.382(*)	.08463	.000
		China	.422(*)	.08561	.000
	Russia	Brazil	-.109	.08301	.629
		India	-.492(*)	.08363	.000
		China	.312(*)	.08462	.004
	India	Brazil	.382(*)	.08463	.000
		Russia	.492(*)	.08363	.000
		China	.804(*)	.08622	.000
	China	Brazil	-.422(*)	.08561	.000
		Russia	-.312(*)	.08462	.004
		India	-.804(*)	.08622	.000

* The mean difference is significant at the .05 level.

What Drives Student Loyalty in Universities:
An Empirical Model from India

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Abstract

Student loyalty is one of the major goals of educational institutions. A loyal student population is a source of competitive advantage. The specific objective of this research was to develop an empirical model linking student loyalty to student satisfaction and student perception of the reputation of the institution. Based on the data collected from students with leading universities in India, a structural model was developed explaining 57.7% of the variance in the student loyalty. The student satisfaction was seen to be a major driver of student's loyalty. The reputation of the institution also had a positive impact on student loyalty through the mediating variable student satisfaction. The research also validated a measurement model for student satisfaction and prioritized various dimensions of the satisfaction construct.

Keywords: Student satisfaction, Student loyalty, Reputation of the institute, University, India

1. Introduction

Performance measurement is so critical for all organizations, and educational institutions are no exception. With the sky-rocketing costs of education across the globe, there are increasing levels of scrutiny by students, parents and prospective employers of the value delivered by the educational institutes.

Universities are increasingly recognizing that higher education is a service industry, and are placing greater emphasis on meeting the expectations and needs of their participating customers, that is, the students. Furthermore, intense competition in today's competitive educational market forces institutions to adopt a market orientation strategy to differentiate their offerings from those of their competitors by delivering superior quality services.

Student loyalty is one of the major goals of educational institutions. A loyal student population is a source of competitive advantage with outcomes such as positive word of mouth (WOM) communication, retention and repeat. The creation and the delivery of superior customer value become important in creating a sustainable advantage in the highly competitive international education market (Kotler and Fox, 2002). Service quality, in this context, is acknowledged as a key performance measure for excellence in education and is a major strategic variable for universities as service providers (Donaldson and Runciman, 1995), with enduring effects on the institution and the students it serves.

The purpose of this paper is to analyze how student loyalty is affected by student satisfaction, and reputation of the university. The specific objective of this research is to identify and validate a structural model linking student loyalty to student satisfaction and student perception of the reputation of the university. The variants of the proposed model are checked through Structural equation modeling approach.

The study was conducted among post graduate students studying in the main campus of leading universities in South India.The paper is organized as follows. In the next part presents the literature review and research model. This is followed by a discussion on the research methodology. Finally, the results are presented and implications are discussed.

2. Literature review and Research Model

Many studies have looked at customer satisfaction and customer loyally in marketing parlance. Even though one might hesitate to call students "customers" because of the student-teacher relationship, the fact is that without students, there would be no need for educational institutions. Hence understanding of linkages among student satisfaction, their

perception about the institution and loyalty to the Alma matter will help universities to devise strategies for operational excellence. Previous research frameworks with respect to these constructs are discussed below.

2.1 Student satisfaction

Customer satisfaction frameworks have been very popular among researchers. (Oliver, 1997; Giese and Cote, 2000; Wiers-Jenssen et al., 2002). Satisfaction has been defined as the perception of pleasurable fulfillment of a service (Oliver, 1997). Operationally, the construct is similar to an attitude as it can be assessed as the sum of the satisfactions with various attributes of a product or service (Churchill & Surprenant, 1982). A number of studies have identified determinants of customer satisfaction. These include ease of obtaining information (Oliva, Oliver, & MacMillan, 1992), attribute level performance (Oliva et al., 1992), prior experience (Bolton & Drew, 1991), and search time in choosing the service (Andersen & Sullivan, 1993). It is known that satisfaction level is determined by the difference between service performance as perceived by the customer and what the customer expects (Parasuraman et al., 1986).

An adaptation of the customer satisfaction concept in education is proposed by Elliot and Healy (2001) who indicate that student satisfaction results from the evaluation of their experience with the education service received. A variety of factors appear to influence student satisfaction. These factors can be divided into personal factors related to the student and institutional factors related to the educational experience. Personal factors include age, gender (Brokaw, Kennedy, & Merz, 2004; Stokes, 2003) and Institutional factors include instructor teaching style (Dana, Brown, & Dodd, 2001), quality of instruction (DeBourgh, 2003), quality and promptness of feedback from instructor, interaction with classmates (Fredericksen et al., 2000) and Infrastructural facilities (Helgesen, 2007).

2.2 Student loyalty

The customer loyalty is manifested in different ways including a commitment to re buy or patronizes a preferred product or service (Oliver, 1997; Reichheld and Sasser, 1990; Dick and Basu, 1994).Student loyalty has both short term and long term impact on the educational institution. Loyal students are influencing teaching quality positively through active participation and a committed behavior (Rodie and Kleine, 2000). Probably they are good advocates, recommending the institution to others. Besides, a growing number of former students are returning to higher educational institutions in order to update their knowledge (Marzo-Navarro et al., 2005).

2.3 Reputation

The reputation of a firm may be interpreted as the overall perception of a company, what it stands for, what it is associated with, and what may be supposed to get when buying the products or using the services of the company (MacMillan et al., 2005; Schuler, 2004; Weiss et al., 1999). Students may have formed a perception about both their school and their specific study program. Reputation management is also looked upon as very important for attracting and retaining students (Bush et al., 1998; Standifird, 2005).

2.4 satisfaction – reputation- loyalty linkages

Customer loyalty is supposed to be positively related to customer satisfaction and to the performance of a business unit (Kotler and Fox, 1995; Zeithaml, 2000; Helgesen, 2006). This link between customer satisfaction and the performance (profitability) of a business unit forms the cornerstone of the marketing concept (Drucker, 1954; Gronroos, 1989). Student satisfaction is supposed to be positively related to student loyalty (Athiyaman, 1997; Schertzer and Schertzer, 2004; Marzo-Navarro et al., 2005) and is seen as a potential antecedent of customer loyalty (Fornell, 1992; Oliver, 1999; Rust & Zahorik, 1993).

Corporate image or reputation has been studied as an antecedent or mediator of constructs regarding the evaluation of organizations, products or services individually or together with satisfaction (Bloemer and De Ruyter, 1998; Bloemer et al., 1998; Andreassen and Lindestad, 1998; Abdullah et al., 2000). Barich and Kotler (1991) argue that a company has a strong image if the clients believe that they receive good value in their transactions with the company. A favorable perception of reputation is supposed to be positively related to loyalty (Johnson et al., 2001; MacMillan et al., 2005).

Øyvind Helgesen and Erik Nesset (2007) proposed and validated a model linking student satisfaction, reputation and loyalty. This model had reputation of the institution acting as a mediating variable between student satisfaction and loyalty. But there are many arguments in literature for looking at reputation as an antecedent to satisfaction. Lim et al. (2000), in referring to the perceived image of a profession point out that image has strong influence on satisfaction, since those employees who see their profession as prestigious, have high levels of satisfaction with their job. Andreassen and Lindestad (1998) verified that corporate image has a strong influence on customer satisfaction. Other authors, such as Hildebrandt (1988) and Mazursky and Jacoby (1986) similarly point out that image precedes

the consumer's evaluation. If the students start off with a positive perception about their university and course of study, there are likely to be more satisfied.

Based on these arguments from literature, we are proposing a research model shown in figure 1 linking the three constructs namely student loyalty, student satisfaction and student perception of the reputation of the university. The model assumes that the dependent variable (student loyalty) has two independent variables (student satisfaction and reputation) linked to it. The model also checks for the indirect impact of reputation on loyalty through the mediating variable called student satisfaction.

3. Research Methodology

The study is designed as a explanatory study using survey method. Data is collected by administering validated instruments to the qualified respondents.

3.1 Measures of concepts

The main concepts included in this study are student satisfaction, reputation and student loyalty. There is no consensus concerning the measurements of these concepts but different approaches are popular. There are generalized measures independent of any particular service context like SERVQUAL (Parasuraman et al., 1988, 1994) and SERVPERF (Cronin and Taylor, 1992), However, many researchers argue that additional dimensions that emanate from industry-specific contexts should be included (Athiyaman, 1997; Abdullah, 2005).

Student satisfaction can be measured by asking questions related to various aspects pertaining to their stint with the educational institutions (Ryan et al., 1995). This study used a modified version of an instrument developed by Øyvind Helgesen and Erik Nesset (2007) and measured student satisfaction with respect to the following dimensions: Quality of academics, quality of administration, quality of social life, quality of infrastructure and quality of support services.

The loyalty and reputation constructs are measured by the instruments developed and validated by Øyvind Helgesen and Erik Nesset (2007. They have used the popular three item measure of loyalty (Dick and Basu, 1994; Oliver, 1997): Chance of recommending the university to friends/acquaintances, Attending the same university if starting from fresh, and the chance of returning to the same university for new courses/further education. The perception of reputation is measured by two items: the students' perceptions of the general reputation of their university and the students' perceptions of the reputation of their chosen study program at the university.

All indicators are measured on a five-point Likert-scale where "1" indicates the least favorable response alternative (Highly dissatisfied / very poor reputation / never recommend etc.) and "5" the most favorable response alternative (very satisfied / very good reputation / strongly recommend etc.).

3.2 Data Collection

Data is collected from students undergoing post graduate programmes in arts, commerce, science, engineering etc the main campus of major Universities in South India. A total of 279 students answered the questionnaire of which 234 answered all the questions relevant for this study. The sample consists of 131 males and 103 females with a mean age of 24 years.

4. Data Analysis

The data analysis is split into two parts: Validating the measurement model of student satisfaction and Validating the structural model (figure 1) linking these constructs.

Structural equation modeling (SEM) is often used for testing theory associated with latent variable models because it enables the inference of complex relationships among variables which cannot be directly observed. SEM is a multivariate statistical methodology, which takes a confirmatory approach to the analysis of a structural theory. SEM provides researchers with the ability to accommodate multiple interrelated dependence relationships in a single model. (Hair et al., 1998). AMOS 4.0, a leading SEM package, was used in this study.

The overall fit of a model in SEM can be assessed using a number of fit indices. There is broad consensus that no single measure of overall fit should be relied on exclusively and a variety of different indices should be consulted (Tanaka, 1993). The indices used include Chi-square ($\chi 2$), Goodness of Fit Index (GFI) (Joreskog and Sorbom, 1989), Non-normed Fit Index (NNFI) (Bentler and Bonet`t, 1980), Comparative Fit Index (CFI) (Bentler, 1990) and Root Mean Squared Residual (RMSR). Table 1 shows major fit measures and guidelines for their acceptable values.

The models can also be evaluated based on the magnitude and the significance of the loading coefficients. These loadings, or parameter estimates, are similar to the reliability measures between a set of indicators and the construct that they measure. The high magnitude and significance of the loadings would further validate the models.

4.1 The measurement model of student satisfaction

Confirmatory Factor Analysis (CFA), which is part of the structural equation modeling (SEM) techniques, can be used to validate a measurement model that specifies the relationship between observed indicators and their underlying latent constructs. The measurement model specifies how latent constructs are measured by the observed variables and it assesses the construct validity and reliability of the observed variables (Joreskog and Sorbom, 1989). CFA is often used to confirm a factor structure known beforehand as is the case with constructs in the study. The measurement model for student satisfaction is shown in figure 2.

Table 2 shows the fit measures for the measurement model of student satisfaction. All the fit indices values as well the reliability value (cronbach alpha) show very good fit validating the measurement model. The loading coefficients of all the observed indicators onto the hypothesized dimensions were also seen to be significant at 1% level further supporting the validity of the measurement model. Since the research used validated models of reputation and loyalty without any change, they were not revalidated.

4.2 Structural model

The proposed research mode (figure 1) is now tested with SEM using AMOS4.0. The model makes an important assumption about the role of satisfaction variable as a mediating variable between reputation and loyalty. To validate this hypothesis, two variants of this model are proposed. The first model called full model will check for both the direct and indirect effect of reputation on loyalty. The second model called indirect model will not estimate the direct path linking reputation to loyalty thereby assuming a strictly mediating relationship. In conducting a multi model analysis using AMOS the procedure suggested by Ho (2006) is used. The step involves (1) defining the full direct model and (2) defining the indirect model in which the direct path linking reputation to loyalty is constrained to zero. Constraining paths to zero is equivalent to those paths not being estimated.

The fit measures of both the model variants are shown in table 3.

Both the models are fitting the data very well as the fit values in both cases are above the cutoffs for very good fit. In such cases where both models are nested (i.e., they are hierarchical models based on the same data set) and have different degrees of freedom, their goodness-of fit can be directly compared. Looking at the Nested Model Comparisons statistics in Table 4, it can be seen that subtracting the indirect model's chi square value from the full model's chi-square value (32.23-31.93) yields a chi-square difference value of 0.3. With 1 degree of freedom (30-29), this statistic is not significant at the 0.05 level and hence indirect model is preferred. This argument is further supported by the Akaike Criterion Information (AIC) comparison statistics. The indirect model yielded a lower AIC value (82.2) than the full model (83.9), which indicates that the indirect model is both better fitting and more parsimonious than the indirect model. Also, the indirect model has slightly better fit indices values for most of the indices compared to full model. Again, in the full model the loading coefficient on the direct path between reputation and loyalty is seen to be insignificant at 5% level. Therefore, we conclude that although both models fitted the data relatively well, the indirect model represents a significantly better fit than the full model, and is to be accepted.

Figure 3 shows the final model with path loading coefficients significant at 0.05 level.

This model demonstrates the linkages among satisfaction, reputation and loyalty for students at universities in India. This model explained 57.7% of the variance in the student loyalty through the effect of direct antecedent variable student satisfaction and the indirect effect of the second variable, reputation. There is a strong positive correlation between satisfaction score and the loyalty score. This implies that the student satisfaction is a major driver of student's loyalty. The reputation also correlates positively with through an indirect impact of 0.44 (0.759*0.574). This means that a student who has a positive perception about the institution is likely to feel more satisfied which in turn will make him/her more loyal. The dimensions of satisfaction also need to be analyzed to see how student satisfaction can be improved. All dimensions have significant loading onto the satisfaction construct and their order of importance can be read from the magnitude of loading coefficients.

5. Discussion and Conclusion

The research proposed and validated a structural model linking satisfaction, reputation and loyalty for students at universities. The study has limitations with respect to sampling and hence the model can not be generalized across the globe. But findings from the study have great value for academic institutions everywhere.

This study has highlighted the importance of student satisfaction in driving student loyalty. The most important aspect of student satisfaction is seen to be teaching quality and the role of the teaching staff. It is evident that lecturers remained the primary contact of the students for both academic and non-academic issues. The feedback from lecturers, good access to lecturers and quality of teaching are perceived to be the most important variables

influencing student satisfaction. This is consistent with previous literature. McManus (2006) found that educational institutions need to understand student expectations in these areas to provide them with a suitable learning environment. The universities need to adopt non-traditional teaching techniques to cater to the specific pedagogical demands of the course (Davies, 2007). Geall (2000) provides evidence of how feedback to students is important given that interaction with lecturers is considered to be an important part of the learning experience. The universities should continuously review the academic programs in terms of their content and quality and should recognize the contribution made by the academic staff in terms of student retention and satisfaction.

The "social life has emerged as the second most important factor in driving student satisfaction. The counseling services, social activities and close working relationships with other students are considered most important variables within the social construct that influence student satisfaction. Most of the students consider social networking and interaction with the outside world, as a major part of their learning experience. Also, social support from friends and seniors can help the students to handle academic stress better (Dunn,2001). Kohut (1997) identified a number of initiatives that would allow students to interact socially with peers as well as with society at large with a view to enriching their student experience.

The administration plays a major support role to academic environment. Institutions should develop a logical, reasonable and transparent administrative environment to foster academic growth. It is very important that key administrators are drawn from academic and should have excellent administrative skills.

The academic institutions should also realize the importance of a range of support services in increasing student satisfaction. These services include job placement support, hostel, canteen etc. Lack of opportunities for employment can be a source of dissatisfaction for the professional students even when they undergo an excellent academic programme (Burke (1986). The students expect quality accommodation and food to be made available in the campus at reasonable cost. Food and accommodation are rated as important factors influencing student satisfaction (Townley, 2001; Harvey ,2001).

The infrastructural facilities like computer centre and library are also very important. Most courses require the constant use of computers, internet and software applications and the presence of modern and adequate computer and library facilities enhances the satisfaction levels of the students (Rodney Arambewela and John Hall, 2009).

Even if the findings imply that the impact of reputation on student loyalty is indirect, the managers should still focus on reputation management and image building. The reputation of an educational institution may have a lot to do for the attraction of top class teachers which in turn leads to higher satisfaction scores (Lemmink et al., 2003). A high image and the prestige of a university are attractive to students as it is expected that such image and prestige would create better career opportunities for them. Gaining international image and prestige as an educational institution is a long and arduous process requiring a commitment to excellence in the delivery of education, and quality research output (Zabala et al., 2005; Rodney Arambewela and John Hall, 2009).

The increased competition among academic institutions is conferring greater importance to the student loyalty as a way to obtain competitive advantage. This increased competition, which is developing internationally, has led to many universities competing fiercely for students, teaching and research staff. In that context, it is imperative for them to appreciate the strong linkages between student satisfaction, institute reputation and loyalty. The institutions which initiate appropriate measures to improve student satisfaction will be in a better position to face successfully the new reality which will take shape in the near future.

References

Abdullah, F. (2005). HEdPERF versus SERVPERF: The quest for ideal measuring instrument of service quality in higher education sector, *Quality Assurance in Education*, Vol. 13 No. 4, pp. 305 – 28.

Abdullah, M., Alnasser, A., Aamjad, D. & Husain, N. (2000). Evaluating functional relationship between image, customer satisfaction and customer loyalty using general maximum entropy, *Total Quality Management*, Vol. 1, No. 4 – 6, pp. 826 – 30.

Anderson, J. C. & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, Vol. 103 No. 3, pp.411-423.

Andreassen, T.W. & Lindestad, B. (1998). Customer loyalty and complex services: The impact of corporate image on quality, customer satisfaction and loyalty for customers with varying degrees of service expertise. *International Journal of Service Industry Management*, 9(1), 7–23.

Arambewela, R. & Hall, J. (2009). An empirical model of international student satisfaction. *Asia Pacific Journal of Marketing and Logistics*, Vol. 21 No. 4, 555 – 569.

Athiyaman, A. (1997). Linking student satisfaction and service quality perceptions: the case of the university education, *European Journal of Marketing*, Vol. 31 No. 7, 528 – 40.

Athanassopoulos, A.D. (2000). Customer satisfaction cues to support market segmentation and explain switiching behavior, *Journal of Business Research*, Vol. 47, 191 – 207.

Barich, H. & Kotler, P. 1991. A framework for marketing image management. *Sloan Management Review* 32: 940-104.

Bentler, P.M. & Bonnett, D.G. (1980). Significance Tests and goodness of fit in the analysis of covariance structures, *Psychological Bulletin*, Vol. 88, 588 – 600.

Bentler, P.M. (1990). Comparative fit indexes in structural models, *Psychological Bulletin*, 238–246.

Bloemer, J., De Ruyter, K. & Peeters, P. (1998). Investigating drivers of bank loyalty, the complex relationship between image, service quality and satisfaction, *Intenational Journal of Bank Marketing*, Vol. 16, No. 7, 276 - 286

Bolton, R. N. & Drew, J. H. (1991). A longitudinal analysis of the impact of service changes on customer attitudes. *Journal of Marketing*, 55,1-9.

Brokaw, A. J., Kennedy, W. A. & Merz, T. E. (2004). Explaining Student Satisfaction, *Journal of the Academy of Business Education*, 62 – 72.

Burke, B.D. (1986). Experience of overseas undergraduate students, Bulletin No. 18, University of New South Wales.

Bush, V., Ferrell, O.C. & Thomas J.L., Jr. (1998). Marketing the business school: An exploratory investigation. *Journal of Marketing Education*, 20(1), 16–23.

Churchill, G. A., Jr. & Surprenant, C. (1982). An Investigation into the Determinants of Customer Satisfaction. *Journal of Marketing Research*, 491 -504.

Cronin, J.J. & Taylor, S.S. (1992). Measuring service quality: reexamination and extension. *Journal of Marketing*, Vol. 56, 55 – 68.

Cute, A. G., Thompson, M.M., & Hancock, B.W. (1999). The McGraw-Hill Handbook of Distance Learning. New York: McGraw-Hill.

Dana, S. W., Brown, F. W. & Dodd, N. G. (2001). Student perception of teaching effectiveness: A preliminary study of the effects of professors' transformational and contingent reward leadership behaviors. *Journal of Business Education*, Vol. 2, 53-70.

Davies, R. (2007). Traditional Education not that bad, The Jakarta Post, 14 April.

DeBorough, G.A. (2003). Predictors of student satisfaction in distance – delivered graduate nursing courses: What matters most. *Journal of Professional Nursing*, Vol. 19, 149 – 163.

Dick, A. & Basu, K. (1994). Customer loyalty: Towards an integrated framework, *Journal of the Academy of Marketing Science*, 22, 99–113.

Donaldson, B. and Runciman, R. (1995), Service quality in further education; An insight into management perceptions of service quality and those of the actual service provider, *Journal of Marketing Management,* 11(1-3):243-256.

Drucker, P.F. (1954). The Practice of Management, Harper and Row, NY, USA.

Dunn, A. (2001). Into the unknown. Education Age, (March7, 2001). 16.

Elliot, K.M. & Healy, M.A. (2001).Key factors influencing student satisfaction related to recruitment and retention. *Journal of Marketing for Higher Education*, Vol. 10 No. 4, 1 – 11.

Fredericksen, E., Shea, P. & Pickett, A. (2000). Factors influencing student and faculty satisfaction in the SUNY learning network. New York: State University of New York.

Fornell, C. (1992). A national customer satisfaction barometer: the Swedish experience. *Journal of Marketing*, Vol. 56, 6 – 21.

Geall, V. (2000). The expectations and experience of first year students at City University of Hong Kong, *Quality in Higher Education*, Vol. 6 No. 1, 77 – 89.

Giese, J.L. & Cote, J.A. (2000).Defining customer satisfaction. *Academy of Marketing Science Review*, 01, 1–34.

Grönroos, C. (1989). Defining marketing: A market-oriented approach. *European Journal of Marketing*, 23(1), 52–60.

Hair, J.F. Jr., Anderson, R.E., Tatham, R.L. & Black, W.C. (1998). Multivariate Data Analysis, (5th Edition). Upper Saddle River, NJ: Prentice Hall.

Harvey, L. (2001). Student Feedback: A report to the higher education funding council for England, Centre for Research and Quality, the University of Central England, Birmingham.

Helgesen, O. (2006).Are loyal customers profitable? customer satisfaction, customer (action) loyalty and customer profitability at the individual level, *Journal of Marketing Management*, Vol. 22, 245 – 266.

Helm, S. (2005). Designing a formative measure for corporate reputation, *Corporate Reputation Review*, Vol. 8 No. 2, 95 – 109.

Helgesen, O. & Nesset, E. (2007). What accounts for students' loyalty? Some field study evidence. International Journal of Educational Management, Vol. 21 No. 2, 126 – 143.

Hildebrandt, C. (1998). Developing mathematical understanding through invented games. Teaching Children Mathematics. 5(3) pp. 191–195.

Ho, Robert, (2006). A Handbook of Univariate and Multivariate Data Analysis and Interpretation with SPSS, Francis and Taylor Group, LLC.

Johnson, M.D., Gustafsson, A., Andreassen, T.W., Lervik, L. & Cha, J. (2001).The evolution and future of national customer satisfaction index models, *Journal of Economic Psychology*, 22, 217–245.

Joreskog, K. G., & Sorbom, D. (1989). LISREL 7: A guide to program and applications (2nd ed.). Chicago: SPSS.

Kohut, L. (1997). Models of Mentoring and Student Peer Support in International Education, Paper presented at the 1997 Australian International Education Conference, Melbourne.

Kotler, P. & Fox, K.F.A. (1995). Strategic Marketing for Educational Institutions. Prentice-Hall.Upper Saddle River, NJ.

Lam, S.Y., Shankar, V., Erramilli, M.K. & Murthy, B. (2004). Customer value, satisfaction, loyalty, and switching costs: an illustration from a business to business service context, *Journal of the Academy of Marketing Science*, Vol. 32 No. 3, 293 – 311.

Lemmink, J., Schuijf, A. & Streukens, S. (2003). The role of corporate image and company employment image in explaining application intentions, *Journal of Economic Psychology*, 24, 1–15.

Lim, K.H., Benbasat,I. & Ward, L.M.(2000). The Role Of Multimedia In Changing First Impression Bias. *Information Systems Research*, (11)2, 115-136.

MacMillan, K., Money, K., Downing, S. and Hillenbrand, C. (2005). Reputation in relationships: Measuring experiences, emotions and behaviors. *Corporate Reputation Review*, 8(2), 214–232.

MarzoNavarro, M., Pedraja-Iglesisias, M. & Rivera-Torres, P. (2005a). A new management element for universities: satisfaction with the offered courses, *International Journal of Education Management*, Vol. 19 No. 6, 505 – 526.

MarzoNavarro, M., Pedraja -Iglesias, M. & Rivera – Torres, P. (2005b), Measuring customer satisfaction in summer courses, Quality Assurance in Education, Vol. 13 No. 1, 53 – 65.

Mazursky, D. & Jacoby, J. (1986). Exploring the development of store images. *Journal of Retailing,* 62 (2): 145-65

McManus, D. (2006). Getting to Know Your Students: Three Challenges, The Teaching Professor, Jun/Jul 2006, Vol. 20 Issue 6, p.8, [Online] retrieved (April 18, 2007).

Oliva, T., Richard L. O., and Ian C. M. (1992), A Catastrophe Model For Developing Service Satisfaction Strategies. *Journal of Marketing*, 56, 83-95.

Oliver, R. L. (1999). Whence consumer loyalty. *Journal of Marketing*, 63 (special) 33-44.

Oliver, R.L. (1997). Satisfaction: A Behavioural Perspective on the Consumer . Irwin/McGraw Hill, New York, NY.

Parasuraman, A., Zeithaml, V. & Berry, L. (1986). SERVQUAL: a multiple-item scale for measuring customer expectations of service quality. Report No. 86 – 108, Marketing Science Institute, Cambridge, MA.

Parasuraman, A., Zeithaml, V.A. & Berry, L.L. (1988). SERVQUAL: a multi-item scale for measuring consumer perceptions of service quality. *Journal of Retailin,*. Vol. 64 No. 1, 12 – 40.

Parasuraman, A., Zeithaml, V.A. & Berry, L.L. (1994). Alternative scales for measuring service quality: a comparative assessment based on psychonometric and diagnostic criteria. *Journal of Retailing*, Vol. 7 No. 4, 309 – 26.

Reichheld, F. & Sasser, W.E. (1990). Zero defections quality comes to services. Harvard Bus. Rev., 68: 105-111.

Rodie, A.R. & Kleine, S.S. (2000).Customer participation in services production and delivery in T.A. Swartz and D. Iacobucci (eds.), Handbook of Service Marketing and Management, Sage, Thousand Oaks, CA, pp. 111–125.

Rust, R.T. & Zahorik, A.J. (1993). Customer Satisfaction, customer retention, and market share. *Journal of Retailing*, 69, 193 – 215.

Ryan, M.J., Buzas, T. & Ramaswamy, V. (1995). Making CSM a powerful tool: composite indices boost the value of satisfaction measures for decision making, *Marketing Research*, Vol.7 No. 3, 11 – 16

Schertzer, C.B. & Schertzer, S.M.B. (2004). Student satisfaction and retention: a conceptual model. *Journal of Marketing for Higher Education*, Vol. 14 No. 1,79 – 91

Schuler, M. (2004). Management of the organizational image: A method for organizational image configuration. Corporate Reputation Review, 7(1), 37–53.

Standifird, S.S. (2005). Reputation among peer academic institutions: An investigation of the US News and World Report's rankings. *Corporate Reputation Review*, 8(3), 233–244.

Stokes, S. P. (2003). Temperament, learning styles, and demographic predictors of college student satisfaction in a digital learning environment. Biloxi, MS: Mid-South Educational Research Association. (ERIC Document Reproduction Service No. ED482454)

Tanaka, J.S. (1993).Multifaceted conceptions of fit in structural equation models. In K.A. Bollen, & J.S. Long (eds.), Testing structural equation models. Newbury Park, CA: Sage.

Townley, P. (2001).The construction of a model of qualitative evaluation to support the development of the policy and practice of raising student satisfaction in an institution in the higher education sector. Conference Proceedings, Higher Education Close Up Conference 2, Lancaster University, UK, July18,2001.

Weirs-Jenssen, J., Stensaker, B. & Grogaard, J.B. (2002).Student Satisfaction: towards an empirical deconstruction of the concept. Quality in Higher Education 8(2), 183-96.

Weiss, A.M., Anderson, E. & MacInnis, D.J. (1999), Reputation management as a motivation for sales structure decisions, *Journal of Marketing*, Vol. 63, 74-89.

Zabala, I., Panadero, L. G., Gallardo, C., Amate, M., Sanchez-Galindo, I. T. & Villalba. I.(2005). Corporate reputation in professional services firms: reputation management based on intellectual capital management. Corporate Reputation Review, 8, 1, 59-71.

Zeithaml, V. A., & Bitner, M. J. (2000). Service Marketing: integrating customer focus across the firm (Second Edition ed.). USA: McGraw-Hill Companies Inc.

Table 1. Fit indices and their acceptable values

Indicators of fit	Target Values for very good fit	Target Values for moderate fit
Normed Chi-square ($\chi 2$)	< 3	< 5
GFI	>0.90	>0.80
AGFI	>0.80	>0.70
RMSR	<0.05	<0.10
RMSEA	<0.05	<0.08
CFI	>0.90	>0.80

Table 2. Fit measures for the measurement model

Fit Indices	Student satisfaction
Normed chi square	0.942
GFI	0.972
AGFI	0.917
CFI	0.989
NFI	0.889
RMSR	0.02
Cronbach alpha	0.864

Table 3. Fit measures for the model variants.

Fit measures	Values for the indirect model	Values for the full model
Chi square (χ2)	32.23	31.93
Normed chi (χ2 / d.f.) square	1.07	1.10
GFI	0.906	0.908
AGFI	0.828	0.825
CFI	0.981	0.975
RMSR	0.035	0.041
Akaike Criterion Information (AIC)	82.2	83.9

Table 4. Nested model comparison

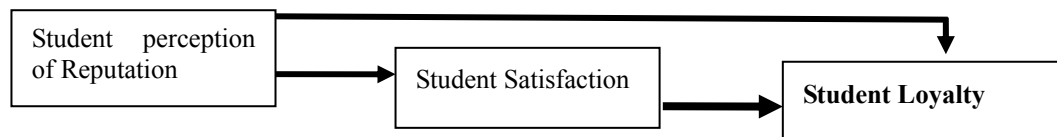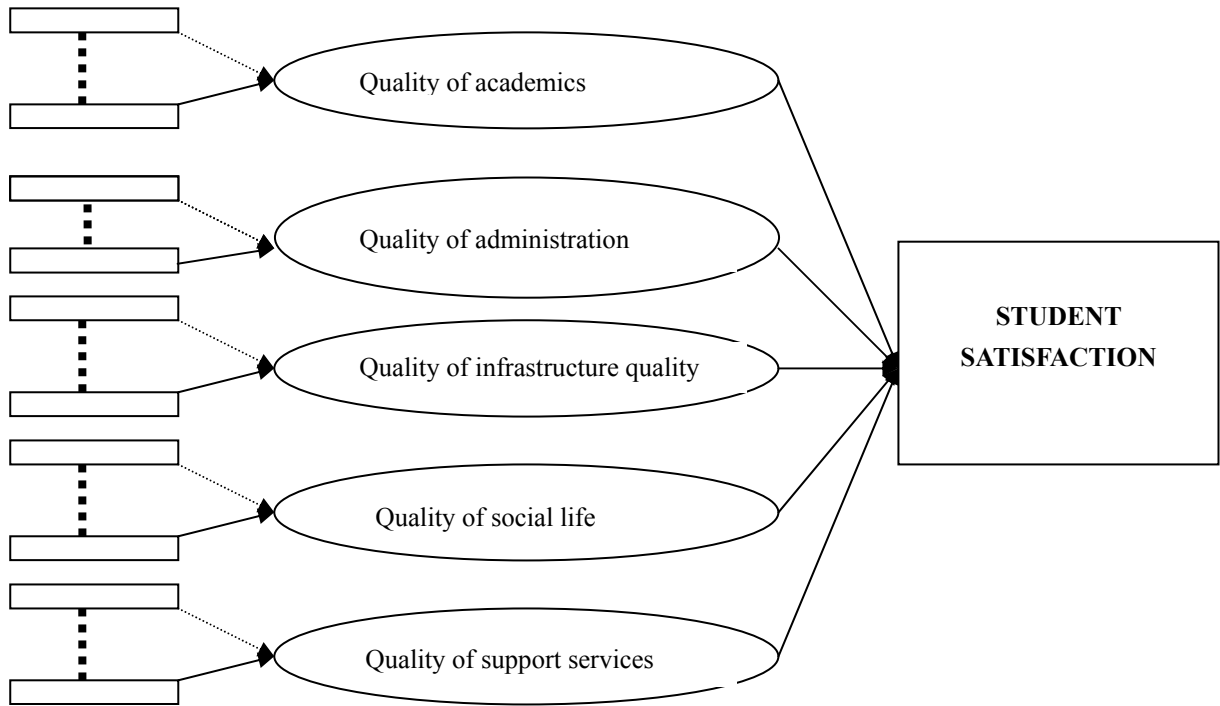|	DF	Chi square (χ2)	P
Full model	1	0.30	0.58

Figure 1. The proposed research model

Figure 2. Measurement model for student satisfaction
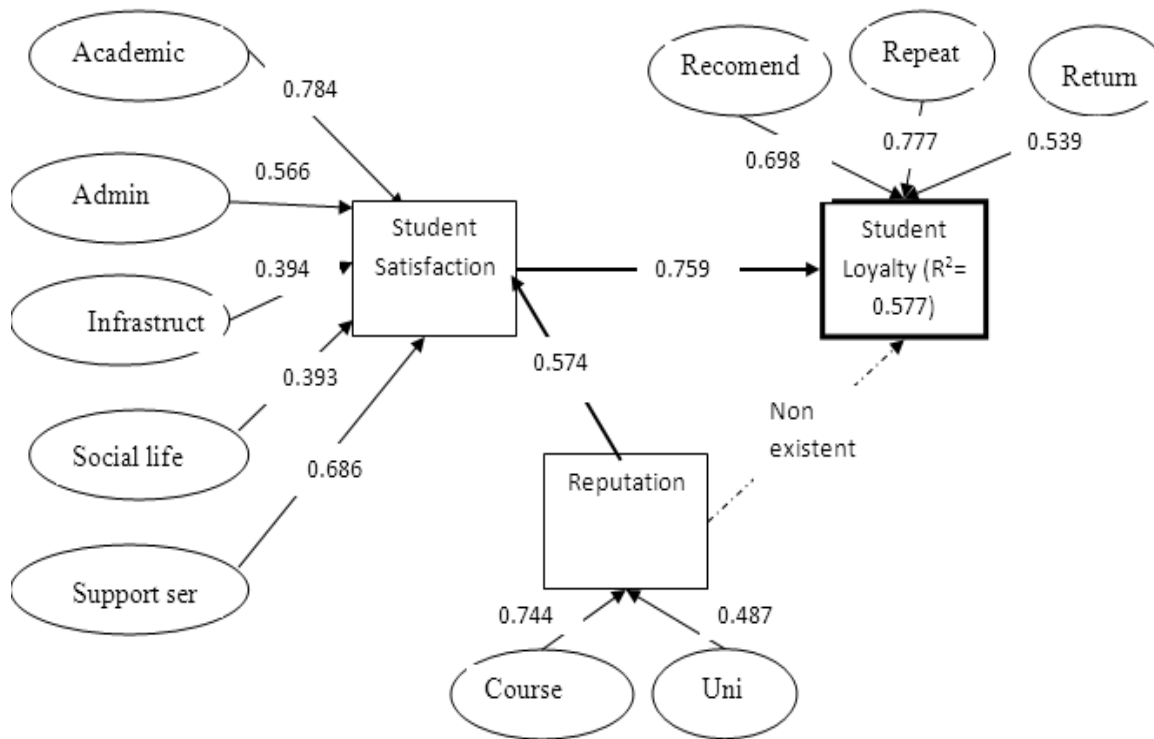
Figure 3. Final model with path loading coefficients

Oil Prices and Financial Markets Activity: Empirical Evidence from Some MENA Countries

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Abstract

This study assesses empirically the effects of oil prices on financial markets activity of some MENA countries (Middle East & North Africa).We have chosen this subject to study aiming to find out and explain if there is a relationship between international oil prices and the prices of the listed securities in the financial markets of Middle East and North Africa. The countries that will be in the sample of analysis are Turkey, Jordan, Egypt, Morocco, Tunis, we targeted these countries of this geographical area based on specific characteristics of these countries as they are oil importers; in the meantime they have sharing borders with big oil exporting countries.

Keywords: Energy Shocks, vector auto regression (VAR), MENA countries (Middle East & North Africa), Lead-Lag Correlations, International oil price.

1. Introduction

Oil prices and Stock Markets

The stock market long has been viewed as an information collection and processing institution. The asset prices establishment depends on information about future prospects as well as current conditions facing firms. The efficiency with which stock markets process information has been a subject of intensive study for several decades. If stock-price or rate-of-return forecasts cannot be improved upon by use of any other information, the case can be made that the stock market is already using all publicly and privately available information in the formation of those prices. It is reasonable to expect that the stock market would absorb the information about the consequences of an oil price shock and incorporate it into stock prices very quickly. Since asset prices are the present discounted value of the future net earnings of firms, both the current and the future impacts of such a shock should be absorbed into prices and returns without having to wait for those impacts to actually occur.

The literature of theoretical and empirical studies on oil prices and Stocks Markets relationship is very tide, maybe due to the short life of oil prices Fluctuations, where the benchmark of these fluctuations in the previous century is the October 1973 Arab-Israeli war and the accompanying embargo of oil shipments to the U.S. by OPEC nations which dramatically changed the oil market.

Another oil price shock in 1979, which followed the Iranian revolution when spot oil prices rose sharply, the recent oil price shock is formulated by the invasion of Iraq by the U.S. army and still osculated with the tension of Iranian–Western World relations because of the Iranian nuclear program and the probability of military conflict in the Arab Golf area which will endanger oil supplies. Third wave of fluctuations is the most recent one that starts from the med of 2003 till the end of 2006.

Never the less, there are some important studies that took this relationship under analysis, one is by Roger D. Huang & others "**Energy Shocks and Financial Markets (1995)**" they examined the contemporary and lead-lag correlations between daily returns of oil futures contracts and stock returns. Their analysis was at three levels; first, for a market stock price index S&P 500 index; second, for 12 stock price indices; third, for three individual oil

company stock price series. The vector autoregressive (VAR) approach is used to examine the lead-lag relation, and its results showed that oil futures returns are not correlated with stock market returns, even contemporaneously, except in the case of oil company returns.

Another important study by Cetin Ciner **"Energy Shocks and Financial Markets: Nonlinear Linkages (2002)"** using same approach of analysis of VAR models and Granger causality tests, to test linear and nonlinear linkages between oil prices and stock prices highlighting the possibility of nonlinear linkages between oil prices and stock prices. Ciner demonstrates a significant nonlinear causal correlation between crude oil futures returns to S&P 500 index returns and evidence that stock index returns also affect crude oil futures. This indicates a feedback relation between S&P 500 stock returns and crude oil futures.

Different approach applied by Gerben Driesprong, Ben Jacobsen, & Benjamin Maat in their paper " **Stock Markets and Oil Prices (2004)** " testing for the existence of an oil-effect they used the usual regression techniques and incorporated an oil-variable roilt-1 in the regression:

$rt= \mu + \alpha1 r^{oil}t\text{-}1 +\varepsilon1$ with $\varepsilon t=rt\text{−}Et\text{ −}1\ [rt]$

Where μ is a constant and $\varepsilon1$ the usual error term, using the above equation they tested whether the coefficient of roilt-1 is significantly different from zero. When $\alpha1$ is significant, this rejects the null hypothesis of no oil effect. From the previous equation the absence of an oil-variable this equation reduced to the well-known random walk model.

"Oil Price Risk and Emerging stock Markets" by Syed A. Basher and Perry Sandusky, they introduced another approach of studying oil Prices Stock Markets relationships by using an international multi-factor (Arbitrage Pricing Theory APT Model), The model estimation follows a two-step process.

In the first step, country stock market betas, oil price betas, and exchange rate betas are estimated using ordinary least squares (OLS) from the following multi-factor model:-

$$Rit = c + \beta mitMRt + \beta oitOILt + \beta eitTWEXt + \varepsilon it .... (1)$$

In equation (1) the country excess returns are Rit (i=1… 21 denotes the country and t denotes the time period), world market excess returns are MRt, oil returns are OILt, and exchange rate returns are TWEXt.

In the second step, unconditional and conditional cross section regressions are estimated for a pooled data set of realized stock returns and risk parameters. Betas from period t are matched with realized stock returns from period t+1.

$$Rit = \gamma0 + \gamma m1\beta mit+ \gamma o1\beta oit +\gamma e1\beta eit + \varepsilon2t .... (2)$$

The market betas, oil betas, and exchange rate betas are estimated from equation (1). Equation (2) specifies an unconditional relationship between returns and risk that is estimated using pooled OLS.

There are some limitations in implementing multi-factor model to study this relationship such as both the CAPM and APT models assumed that expected returns, risk factors and risk premiums are linearly related which it is not a must.

A recent study by George Bittlingmayer **"Oil and Stocks: Is it War Risk? (2005)"** Using simple regression technique by combining the percentage changes in the value-weighted stock price index on percentage changes in oil prices (West Texas Intermediate) for the period 1983-2004.

In a recent study by Dawid Brychcy "The impact of oil prices on international financial markets (2006)" the researcher evaluates the influence of the returns on the oil prices on international financial markets. Using the family of GARCH models (both univariate and multivariate) he assesses the effects from the changes in the oil prices to the main stock markets in the world. In his analysis he include the returns on the DJIA, S&P 500, NASDAQ, FTSE 100, DAX, NIKKEI 225 and the returns on the WTI crude price. The results show that oil prices have impact on all the stock markets but this influence takes different forms. He has obtained that only DJIA and S&P500 directly react to the changes in returns on oil prices. This impact is negative and very low. There are no asymmetric effects of the changes of oil prices on the stock markets and already one day lag does not have any influence more. The returns on American stock markets are influenced by the volatility of oil prices as well and this effect seems to be more significant.

The traditional definition of Stock prices is the discounted values of expected future cash flows. Oil prices can affect both the expected cash flows and discount rates for different reasons. Oil prices affect future cash flows as an important input in the production process. The increasing oil prices raise the cost of production and lower benefits of the companies - this effect depends on whether the company is a net producer or net consumer of oil.

Oil prices can affect the stock prices through the discount rates because the expected discount rate is the sum of the expected inflation rate and expected real interest rate, both of which may in turn depend on oil prices.

From this literature review the methodology of research to study Oil and Stock prices relationships is confirmed to be in two analytical framework, the first is by using simple Regression Techniques (multi factor models) and the other one is more sophisticated by using VAR models and Granger causality tests which we think that this methodology is more reliable to clarify such relations in a good manner.

This paper is organized as follows. Section 2 describes the data and methodology. Section 3 reports the empirical results of tests for the correlation structure between main indices that are calculated and published by the stock market authority and one of the main indicators for international oil prices. The last section concludes the paper.

2. Data and Methodology

In this study we exploit the daily closing price of the Europe Brent Spot Price FOB which considered as worldwide main indicator of oil price and used by most studies as a proxy for International Oil Prices, and time series of daily closing prices for the general index calculated and published by the stock exchange authority in each country included in the analyses which are (Morocco, Tunisia, Egypt, Jordan, and Turkey), the time series starts from 1 January 2004 to 31 December2006.

2.1 Data

-       Data base of this study which will be used in the analysis consist of two categories:

•   Time series of daily closing prices for the general index calculated and published by the stock exchange authority in each country included in the analyses which are (Morocco, Tunisia, Egypt, Jordan, and Turkey), the time series starts from 1/1/2004 to 31/12/2006, with an average of 740 observations.

•   There are many price indicators of international oil price some considered as regional rather than worldwide indicators, while others depend on output (pricing) of more mature markets. In general, the most appropriate and used as a proxy for international oil prices are Brent Blend United Kingdom and West Texas United States, because of the pricing mechanism that produces those prices which relay on many reasonable economic and financial factors, also most of literature relay on these two price indicators as a proxy for oil factor in the analysis. While WTI (West Texas of the United States) pricing system is affected by some other factors of financial and economical like political and natural factors. So it is more convenient to use crude oil price time series that produced by Brent Blend of the United Kingdom pricing system which by the way have no major differences from that of West Texas of the United States pricing system, which both relay on too many market factors with a great role to demand-supply pricing mechanism. The time series related to the closing prices of international crude oil is the closing prices of Brent Blend of the United Kingdom and for the same time period from 1/1/2004 to 31/12/2006.

Data consist of daily closing prices of international oil are obtained from the U.S. Department of Energy database and the daily closing prices of the general index calculated and published by the stock exchange authority in each country included in the analyses which are (Morocco, Tunis, Egypt, Jordan, and Turkey), the time series start from 1/1/2004 to 31/12/2006, Financial markets indices are in local currency of each country, oil prices are in U.S. dollars.

In the analysis the prices are expressed as:

IOP: international oil price

IOP_t = return of international crude oil at time t

FMA: financial market activity that will be measured by index (INDX) and expressed by this equation:

FMA_{kt} = return of main index of country k at day t

The issue of determining the appropriate sampling frequency is not standardized in the literature of finance. Never the less, the sample size in this study is considered to be comprehensive and convenient with a good time coverage that suits the purpose of this study.

2.2 The Applied Methodology

3. Correlation structure

In this section of the paper the study investigates of the short-and long-term relationships between MENA countries financial markets and international crude oil. Limited studies had been made on the financial markets activity linking it to several financial and economical factors. This study aims to fill this gap by investigating the short and long-term relationships between financial markets in some MENA countries and international crude oil prices.

This study expects at least one market would be affected by international oil prices fluctuations, if they are found to be co integrated. it means that past values of international oil prices can be used to predict the future stock market index or vice versa.

• Cross-correlation

• 5 Days lag correlation

• The VAR framework

1. Cross-correlation

The first step in the analysis examines the correlation of all time series under analysis by introducing the correlation matrix.

2. led-lag correlations

5 Days lag correlations were estimated by regressing the current return of financial market k time series on international oil current and prior five days' returns, that is, the following regression was estimated:

$$r_t^k = \alpha_0 + \alpha_1 r_t^{Oil} + \alpha_2 r_{t-1}^{Oil} + \alpha_3 r_{t-2}^{Oil} + \alpha_4 r_{t-3}^{Oil} + \alpha_5 r_{t-4}^{Oil} + \alpha_6 r_{t-5}^{Oil} + \varepsilon_t$$

Where

r_t^k is return of financial market K at time t (k = 1….5).

r_{t-i}^{oil} is return of International oil market at time t-i (i= 0, 1….5Days)

1. The VAR framework

Using vector auto regression (VAR) system which is commonly used for forecasting systems of interrelated time series and for analyzing the dynamic impact of random disturbances on the system of variables, I'll analyze the dynamic of correlation between each stock market index and oil prices separately, which is the same econometric model approach that partially applied by Cetin Ciner (2001) and totally by Roger D. Huang, Ronald W. Masulis, Hans R. Stoll (1995) and expressed by these equations:

$$FMA_t = \alpha + \sum_{i=1}^{m} \beta_i IOP_{t-i} + \sum_{j=1}^{m} \lambda_j FMA_{t-j} + \varepsilon_t$$

$$IOP_t = \delta + \sum_{j=1}^{m} \psi_j FMA_{t-j} + \sum_{i=1}^{m} \mu_i IOP_{t-i} + \omega_t$$

Econometric Results

4. Data base tests Results (The characteristics of market)

Descriptive Statistics

This section considers the empirical characteristics of returns in the capital markets under analysis which are international oil market and some financial markets at MENA area which are Morocco, Tunisia, Egypt, Jordan, and Turkey financial markets.

Insert Table 1 Here

Concerning the main descriptive statistics, I observe that the returns in international oil market were characterized by the highest standard deviation, so the volatility of oil prices was the biggest one among all the series of returns under consideration. The value of the Skewness in Turkey, Egypt, and Casablanca is negative which shows that the returns are left-skewed and the kurtosis in the case of the returns is much smaller than in the case of the series of levels which indicates thin tails in the distribution. Those are the common stylized facts observed in the series of returns on capital markets.

For each of the series of returns I have performed the Jarque-Bera test for the null hypothesis at 5% level of significance which allows me to reject the null hypothesis about normality. The Jarque-Bera test shows that the returns do not have the normal distribution.

Correlation Structure Results

As a first step towards exploring the bilateral effects of oil price changes and some MENA financial markets returns, I'll introduce the correlation matrix as a primary indicator for the bilateral relationship between all-time series under analysis. This simple analysis can be used as guidance through the advanced statistical analysis process.

Cross-correlation

Introducing the correlation matrix as a simple statistical analysis which shows the strength and direction of relationship between two variables, from the table below (Table 9) all time series are positively related while the strength of the relation vary in a wide difference, the weakest one is that between Jordan and Casablanca financial markets (0.389440), the strongest is between Tunis and Casablanca (0.956215) which consistent with the fact that both Tunis and Casablanca are highly correlated due to the geographical and structural similarities between these two markets.

Nevertheless the main benefit from this analysis is by giving a preliminary indicator about how each two factors are moving together,   without making further clarification about the time span of bilateral effects, the direction of the relationship (which factor cause the other)…….etc. all these questions will be answered in the next advanced level of statistical analysis.

Insert Table 2 Here

Lead-lag correlations

5 Days lag correlations were estimated by regressing the current return of financial market k on international oil market current and prior five days' returns, that is, the following regression was estimated:

$$r_t^K = \alpha_1 r_t^{Oil} + \alpha_2 r_{t-1}^{Oil} + \alpha_3 r_{t-2}^{Oil} + \alpha_4 r_{t-3}^{Oil} + \alpha_5 r_{t-4}^{Oil} + \alpha_6 r_{t-5}^{Oil} + \varepsilon_t$$

Where

r_t^k is return of financial market K at time t (k = 1….5).

r_{t-i}^{Oil} is return of International oil market at time t-i (i= 0, 1….5Days)

Casablanca and oil 5 Days lag correlations

5 Days lag correlations were estimated by regressing the current returns of Casablanca financial market on international oil market current and prior five days' returns, that is, the following regression was estimated:

$$r_t^{CSE} = \alpha_1 r_t^{Oil} + \alpha_2 r_{t-1}^{Oil} + \alpha_3 r_{t-2}^{Oil} + \alpha_4 r_{t-3}^{Oil} + \alpha_5 r_{t-4}^{Oil} + \alpha_6 r_{t-5}^{Oil} + \varepsilon_t$$

Where

r_t^{CSE} : Daily returns of general index of Casablanca Stock Exchange (Casablanca Financial Market).

By applying Ordinary Least Squares test to explore the bilateral relation between each financial market and international oil market with 5 Days lags. This model of analysis has produced the following equation:

$$r_t^{CSE} = -0.0239 r_t^{Oil} + 0.0011 r_{t-1}^{Oil} - 0.0662 r_{t-2}^{Oil} - 0.0137 r_{t-3}^{Oil} + 0.0168 r_{t-4}^{Oil} - 0.0962 r_{t-5}^{Oil} + \varepsilon_t$$

From the previous equation I can notice that:

1. CFM (Casablanca Financial Market) returns are negatively related with IOM (International Oil Market) returns at the same day of trading in both capital markets.

2. Returns in CFM are positively related with returns of IOM for previous, the past fourth trading days (T-1, T-4).

3. Returns in CFM are negatively related with returns of IOM for trading days (T-2, T-3, and T-5).

Egypt and oil 5 Days lag correlations

The same statistical model was applied for returns of both (EFM) Egypt Financial Market and IOM; the regression equation was as follow:

$$r_t^{CASE} = 0.06520 r_t^{Oil} - 0.016081 r_{t-1}^{Oil} + 0.070252 r_{t-2}^{Oil} - 0.010973 r_{t-3}^{Oil} - 0.058741 r_{t-4}^{Oil} - 0.001823 r_{t-5}^{Oil} + \varepsilon_t$$

Where

r_t^{CASE}: Daily returns of general index of Cairo and Alexandria Stock Exchange (Egypt Financial Market).

From the previous equation I can notice that:

1. (EFM) Egypt Financial Market returns are positively related with IOM (International Oil Market) returns at the same day of trading in both capital markets.

2. Returns in EFM are also positively related with returns of IOM for trading days (T-2).

3. Returns in CFM are negatively related with returns of IOM for trading days (T-1, T-3, T-4, and T-5).

Jordan and oil 5 Days lag correlations

The regression equation for Jordan Financial Market (JFM) and IOM returns was as follow:

$$r_t^{ASE} = -0.021723\, r_t^{Oil} + 0.018090\, r_{t-1}^{Oil} + 0.029083\, r_{t-2}^{Oil} + 0.004927\, r_{t-3}^{Oil} - 0.036395\, r_{t-4}^{Oil} - 0.043668\, r_{t-5}^{Oil} + \varepsilon_t$$

Where

r_t^{ASE} : Daily returns of general index of Amman Stock Exchange (Jordan Financial Market).

From the previous equation I can notice that:

1.   (JFM) Jordan Financial Market returns are negatively related with IOM (International Oil Market) returns at the same day of trading in both capital markets.

2.   Returns in JFM are also positively related with returns of IOM for   trading days (T-1, T-2, and T-3).

3.   Returns in JFM are negatively related with returns of IOM for trading days (T-4, and T-5).

4.   Tunis and oil 5 Days lag correlations

In accordance to Tunis stock exchange the 5 days lag regression results were as follows:

$$r_t^{TSE} = 0.006169\, r_t^{Oil} + 0.043176\, r_{t-1}^{Oil} + 0.104778\, r_{t-2}^{Oil} - 0.054887\, r_{t-3}^{Oil} - .071087\, r_{t-4}^{Oil} + 0.006984\, r_{t-5}^{Oil} + \varepsilon_t$$

From the previous equation I can notice that:

1. (TSE) Tunis Financial Market returns are positively related with IOM (International Oil Market) returns at the same day of trading in both capital markets.

2. Returns in TSE are also positively related with returns of IOM for   trading days (T-1, T-2, and T-5).

3. Returns in TSE are negatively related with returns of IOM for trading days (T-3, and T-4).

Turkey and oil 5 Days lag correlations

For turkey Financial Market correlation with 5 days lag of IOM there was same behavior with that of other financial markets under consideration, the following equation was the result of regressing lagged oil returns on turkey financial market returns:

$$r_t^{ISE} = \mathbf{0.006169}\, r_t^{Oil} + \mathbf{0.043176}\, r_{t-1}^{Oil} + \mathbf{0.104778}\, r_{t-2}^{Oil} - \mathbf{0.054887}\, r_{t-3}^{Oil} - \mathbf{0.071087}\, r_{t-4}^{Oil} + \mathbf{0.006984}\, r_{t-5}^{Oil} + \varepsilon_t$$

Where

r_t^{ISE} : Daily returns of general index of Istanbul Stock Exchange (Turkey Financial Market).

From the previous equation I can notice that:

1. (TFM) Turkey Financial Market returns are positively related with IOM (International Oil Market) returns at the same day of trading in both capital markets.

2. Returns in TFM are also positively related with returns of IOM for   trading days (T-1, T-2, and T-5).

3. Returns in TFM are negatively related with returns of IOM for trading days (T-3, and T-4).

Gross Summary of Lead-Lag Correlations

From the previous results I can notice that there is a pattern of financial markets behavior towards the international oil market returns, this pattern indicate that investors (especially oscillators) are maneuvering from financial market to oil market on a daily bases and any new investor have intention to invest or oscillate in these financial markets should put under his consideration the behavior of returns in International Oil Market.

5. The VAR framework

The VAR model takes account of the simultaneous interaction of the time series of International Oil Market Returns and some MENA Financial Markets Returns. Let IOP be International Oil Market Returns, let FMA be one of 5 MENA Financial Markets Returns. The VAR representation can be expressed as a two equation system:

$$\text{FMA}_t = \alpha + \sum_{i=1}^{m}\beta_i IOP_{t-i} + \sum_{j=1}^{m}\lambda_j FMA_{t-j} + \varepsilon_t \quad\cdots\cdots\cdots \text{(a)}$$

$$\text{IOP}_t = \delta + \sum_{j=1}^{m}\psi_j FMA_{t-j} + \sum_{i=1}^{m}\mu_i IOP_{t-i} + \omega_t \quad\cdots\cdots\cdots \text{(b)}$$

The approach is to estimate the system of equations, (a) and (b) and to test a series of hypotheses about the lead-lag relation of some MENA Financial Markets returns and International Oil Market returns. The important benefit of the VAR system (a) and (b) is that it controls for factors such own serial correlation. It is also possible to distinguish one-way leads or lags from feedback relations.

The null hypothesis that International Oil Market Returns do not lead some MENA Financial Markets Returns can be stated in the context of the VAR model as:

$$H^{1}0: \quad \beta_i = 0 \quad , \quad (i=1 \ldots 5) \ldots\ldots\ldots\ldots\ldots (A)$$

The likelihood ratio under the null is asymptotically distributed as chi-square. The null hypothesis that some MENA Financial Markets Returns do not lead International Oil Market Returns can be stated in the context of the VAR model as:

$$H^{2}0: \quad \psi_j = 0 \quad , \quad (j=1,\ldots\ldots5) \ldots\ldots\ldots\ldots(B)$$

An F-test can be used to examine the exclusion restrictions in (B).

6. Leads and lags in returns

The VAR model estimates for the various time series of returns are presented in the Table below. The results for H10 are very interesting which express the rejection of the null hypothesis of that oil does not lead MENA Financial Markets for all financial markets under consideration, while for F-statistics test parameters show the acceptance of H20   that MENA Financial Markets do not lead oil prices changes.

VAR Tests of Granger Causality between Returns on International Oil Markets and MENA Financial Markets

Insert Table 3 Here

So for any investor who is trading in financial markets under analysis should follow up the changes in International Oil prices not just for quick swings but especially for slow long motion. The main clarification for these results is related (in my point of view as a financial consultant in three of the five financial markets under analysis) is directly consistent with the strategies of trading and investment of international cash flow especially for excess liquidity in the Gulf area that seeks for profitable, secure, and above all the flexibility of cash flow from and to the final destination of cash.

References

Kamal A. Al-Qudah. (1997). An Empirical Testing of the Randomness Hypothesis in Amman Financial Market, Dirasat, *Administrative Sciences*, 24, No.2.

A.Yuce and C. Sigma-Mugan. (1996). An Investigation of the Short- and Long-Term Relationships between Turkish Financial Markets, *the European Journal of Finance*, 2, pp. 305-317.

Bwo-Nung Huang, Chin-Wei Yang & John Wei-Shan Hu. (2000). Causality and Cointegration of Stock Markets among the United States, Japan, and the South China Growth Triangle, *International Review of Financial Analysis*, 9:3, pp.281-297.

Wilson H.S. Tong. (2001). Cointegration, Efficiency and Forecasting in the Currency Market, *Journal of Business Finance & Accounting*, 28(1) & (2). 0306-686x.

Paul A. Volcker. (1975). Inflation, Recession, Oil, and International Financial Markets, *Journal of International Affair*, 9, No.1.

Cetin Ciner. (2001). Energy Shocks and Financial Markets: Nonlinear Linkages, *Studies in Nonlinear Dynamics and Econometrics*, 5(3): pp.203-212.

Joshua M. Pollet. (2002). Predicting Asset Returns With Expected Oil Price Changes, *Journal of Business Finance & Accounting*, 21(1). pp 112-143.

Gerben Driesprong, Ben Jacobson & Benjamin Maat. (2003). Stock Markets and Oil Prices, Working Paper.

Syed A. Basher, Perry Sadorsky. (2005). Oil Price Risk and Emerging Stock Markets, Working Paper.

Bernd Hayo & Ali M. Kutan. (2005). The Impact of News, Oil Prices, and Global Market Developments on Russian Financial Markets, *Economics of Transition*, 13(2). pp.373-393.

Dawid Brychcy. (2006). The Impact of Oil Prices on International Financial Markets, Working Paper.

Roger D. Huang, Ronald W. Masulis & Hans R. Stoll. (1995). Energy Shocks and Financial Markets. Working Paper.

Daniel B. Thornton & Michael Welker. (1999). Impact of Market Risk Disclosures on Stock Price Sensitivity to Oil and Gas Prices.

Stephen P. A. Brown, Mine K. Yucel & John Thompson. (2003). *Business Cycles: The Role of Energy Prices*.

George Bittling Mayer. (2005). *Oil and Stocks: Is it War Risk?*

Kim R. Sawyer & Mohan Nandha. (2005). *How Oil Moves Stock Prices*.

Sridhar Gogineni & Michael F. Price. (2006). *The Stock Market Reaction to Oil Price Changes.*

Christopher Gan, Minsoo Lee, Hua Hwa Au Yong & Jun Zhang. (2006). Macroeconomic Variables and Stock Market Interactions: NEW ZEALAND Evidence, *Investment Management and Financial Innovations*, Volume 3, Issue 4.

Table 1. The main statistics of the data

	Oil	Casablanca	Egypt	Jordan	Tunis	Turkey
Mean	0.00117418	0.00128427	0.00256861	0.00117389	0.00071537	0.00113078
Median	0.00087655	0.00132538	0.00229638	0.00096817	0.00050627	0.00225732
Maximum	0.12152309	0.05721414	0.07072783	0.08721377	0.02743527	0.05869820
Minimum	-0.06986821	-0.04892967	-0.07617046	-0.07205074	-0.01385887	-0.08305536
Std. Dev.	0.02123935	0.00902663	0.01795082	0.01509983	0.00528298	0.01730020
Skewness	0.30526074	-0.12221322	-0.22669678	0.01195026	0.50571429	-0.27769700
Kurtosis	4.79687733	8.59658848	5.07939562	5.54385006	4.98833786	3.85401746
Jarque-Bera	47.11275	92.21483	86.45676	76.49738	88.71273	51.46588
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Observations	741	741	741	741	741	741

Table 2. Correlation matrix of 6 capital markets included in the analysis.

	OIL	CASABLANCA	EGYPT	JORDAN	TUNIS	TURKEY
OIL	1.000000	0.742972	0.853658	0.739412	0.760066	0.826535
CASABLANCA	0.742972	1.000000	0.751994	0.389440	0.956215	0.813814
EGYPT	0.853658	0.751994	1.000000	0.859753	0.748198	0.946995
JORDAN	0.739412	0.389440	0.859753	1.000000	0.425298	0.750307
TUNIS	0.760066	0.956215	0.748198	0.425298	1.000000	0.759077
TURKEY	0.826535	0.813814	0.946995	0.750307	0.759077	1.000000

Table 3. The VAR model estimates for the various time series of returns.

MENA Financial Markets	International Crude Oil			
	$H^1 0$: Oil does not lead MENA Financial Markets		$H^2 0$: MENA Financial Markets do not lead oil	
	χ^2	P-Value	F-Statistics	P-Value
Casablanca Stock Exchange (CSE)	4282.750	0.000959	0.511214	0.001077
Cairo and Alexandria Stock Exchange (CASE)	3739.033	0.002222	1.738990	0.000904
Amman Stock Exchange	3870.797	0.001212	0.687087	0.000972
Tunis Stock Exchange	4655.941	0.000584	0.789911	0.000940
Istanbul Stock Exchange	3761.526	0.001088	0.486687	0.001019

Study on the Problems and Countermeasures of Interior Auditing of Enterprise Groups in China

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Abstract

In recent years, some problems existing in the interior auditing of Chinese enterprise groups have directly or indirectly influenced the enhancement of the management and economic benefit of enterprise group. In this article, based on detailed analysis of these problems, following countermeasures are put forward, including perfecting the management mode of interior auditing, perfecting the program of interior auditing, performing the interior auditing by computer, and enhancing the auditors' quality of interior auditing.

Keywords: Enterprise group, Interior auditing, Mode, Auditors' quality

1. Introduction

Enterprise group is the business entity association with certain scale, which is composed by the parent company, the subsidiary companies, the joint stock companies, and other member enterprises or institutions taking the parent company and subsidiary companies linked by capitals as the main body, and taking the group constitution as the common behavior standards.

The member enterprises in the enterprise group are not in a mess. To harmonize the management among member enterprises to form the join forces in the group, effectively distribute resources of the group, ensure the realization of the group target, manage the group better for the highest management layer, enhance the efficiency of the group, the economical efficiency and the legality of the economic management of all member enterprises should be evaluated and supervised, so the interior auditing of the enterprise group occur, and it supervises and evaluates the financial income and expenses, and the economic activities of the group company, the subsidiary company, the holding companies, and the joint stock companies according to relative laws and regulations by the professional auditing institutions and auditors in the group, to perfect the management of the whole group and enhance the economic benefit.

2. Problems existing in the interior auditing of Chinese enterprise groups

In 1983, large and medium-sized state-owned enterprise of China successively established their interior auditing institutions and implemented the interior auditing supervision. After 20 years' development, the interior auditing of China has been developed very well, and at present, there are about thirty thousands interior auditors in China, and the structure of auditors begin to become reasonable, and in many industries such as petroleum, electric power, and aviation, the chief auditor system has been implemented, and the interior auditing institutions have exerted active functions to strengthen the management and enhance the economic benefits. But at present, the interior auditing of enterprise group in China is still in the initial stage, and still has some problems as follows.

2.1 The interior auditing institutions of enterprise groups have weak independence and bad objectivity

Most enterprise groups adopt the general management leading mode, and the interior auditing is leaded by the general manager directly, which works in the general manager's scope of authority and is parallel with other departments. First, the interior auditing institution is leaded by the general manager, integrating the implementation and supervision function, which would not effectively supervise general manager's economic responsibility and management behaviors. Second, the interior auditing institution is parallel with other functional departments, so it usually could not supervise and evaluate those financial department and other management departments on its layer, and it could only audit underling departments.

2.2 The functions of the interior auditing of enterprise group have not be exerted sufficiently

As viewed from the development history of interior auditing, there are three layers. The first one is the financial

auditing, and the second one is the operational auditing, and the third one is the management auditing. The interior auditing of Chinese enterprise group started from financial auditing, i.e. mainly checking the legality and rationality of financial income and expenses and the authenticity of accounting information, and the auditing objects mainly include accounting reports, account book, certificates, and relative materials. In the practice, the interior auditing in most companies is to check errors and compensate losses, and the emphasis is the financial auditing, and it could not systematical and authoritatively evaluate the interior control system of the enterprise, so it could not discover and objectively evaluate the potential risk of the enterprises, and could not put forward essential and predictive management advices to the management administration. The interior auditing in the present stage could not fully exert the important function of the interior auditing in the enterprise group, because the real task of the interior auditing is to provide necessary decision-making information for enterprise managers and promote managers to enhance the management level and economic benefits by the prior prediction, stage supervision, and past auditing.

2.3 The interior auditing measures of enterprise groups are lagged

At present, most large-scale enterprise groups have realized the networking of information system, and the computer network system in the group could centralize all fund flows and budget enforcements, and the parent company could transfer the financial state of subsidiary companies at any time, and supervise the management of subsidiary companies real time. However, many works of the interior auditing institutions of many Chinese enterprise groups have still been in the testing stage of manual operation, which could not adapt the requirements of the development obviously, and could not supervise the management and decision-makings for the enterprises.

2.4 Auditors' quality of interior auditing of enterprise groups is lower

With the transformation of the interior auditing of enterprise group from financial auditing to operational auditing and management auditing, the quality of interior auditors should be higher and higher. But most interior auditors of Chinese enterprise groups were from financial employees, and many of them have not been trained systematically and professionally, lacking in the knowledge and experience of management. According to relative statistics, in 12 millions of accounting employees, only about 20% of them have been educated above middle level.

3. Countermeasures to perfect the interior auditing of Chinese enterprise group

At present, above problems in the interior auditing of Chinese enterprise groups have seriously influenced the interior control and risk-resistance for enterprise groups, so following countermeasures are suggested.

3.1 Perfecting the management mode of interior auditing and strengthening the independence and subjectivity of the interior auditing institutions of enterprise groups

The establishment and management of the interior auditing institution in modern enterprise groups should flexibly select and use the interior auditing management mode according the institution of the enterprise group. First, for the auditing committee of enterprise group under the directorate of the group company, the committee members should be assumed by non-executive directors, and independent directors should occupy most posts, and some enterprises could invite the principals of some operation departments or external experts, and this committee should be authorized by the board of directors and be the permanent institution. The auditing committee is subject to the board of directors, and it directly reports to the board of directors, without the limitations from the management layer and the operation departments, and it should perform its responsibilities independently. Second, the auditing agency of the subsidiary company has not the legal personality, but the core subsidiary company in the group should have professional auditors or establish the auditing agency, which could supervise the daily auditing to the subsidiary company, or else, the subsidiary company should accept the direct supervision of the auditing committee of the group company. Third, for the independent auditing institution of the subsidiary company, the subsidiary company with the legal personality should independently establish the interior auditing institution independently according to the management scale. The interior auditing institution should be leaded under the board of directors of the subsidiary company, and the auditing institution of the subsidiary company should be responsible for the group auditing committee, and the subsidiary company could also have not the independent auditing institution, and the auditing committee of the group company should establish the auditing agency in the subsidiary, which should be agreed by the board of directors of the subsidiary company. The auditing committee leads the interior auditing, which could strengthen the independence and authority of the interior auditing, and fully exert the supervision function of the interior auditing.

3.2 Perfecting the interior auditing programs and fully exerting the interior auditing function

To transform the work procedure and establish the whole-course supervision interior auditing work mode including pre-event prevention, mid-event supervision, and after-event auditing, and run through the whole course of the management, could realize the anticipated benefit of the enterprise group. The present interior auditing of China

places extra emphasis on the after-event auditing, and pay attention to the pre-event prevention and the mid-event supervision not enough, which could not eliminate risks and losses in the initial stage, and can not effectively prevent the risk, reduce the losses, and enhance the management efficiency. Therefore, the focus of the auditing work should be transferred from the traditional after-event auditing to the whole-course supervision interior auditing work mode including pre-event prevention, mid-event supervision. In the practice, not only the important management decision-makings, the key investment projects, and the purchase and sale business occupying large numerous of capitals of the enterprise group should be audited before the event, but also the materials and budgets about the feasibility and the authenticity, the rationality, and the validity of the economic contract should be supervised and evaluated, to feed back the information and prevent the faults. At the same time, to implement effective supervision and check in the implementation of project or work could discover and correct faults in time, and eliminate risk, hidden troubles, and losses in the initial stage.

3.3 Perfecting the measures and methods of interior auditing and using computer to perform interior auditing

In many large enterprise groups, the networking of the computer information system has been realized basically, and both the auditing environment and the auditing objects are more complex, and if auditors still use the manual operation mode, the auditing target is hard to achieve. Therefore, the enterprise group should strengthen the technology investment in the interior auditing of enterprise to break the interior auditing work of enterprise away from the manual operation, and enter into the development stage of information and standardization early, and adapt the interior auditing work of enterprise under variable situations by modern and scientific measures. Auditors' operation measure should transform from manual operation to computer operation, i.e. auditors should grasp the computer knowledge and relative application technologies, develop new auditing procedures, establish more careful auditing plan, and use the computer as a kind of powerful toll to enhance the auditing quality and efficiency.

3.4 Enhancing auditors' quality of interior auditing and optimizing the group structure

The quality of interior auditing is largely determined by interior auditors' quality. Auditors' quality should be further enhanced, and their knowledge about finance, statistics, economic activity analysis, financial tax, marketing, writing, and computer should be trained periodically, and their subsequent education and moral education should be also strengthened to cultivate their sensitive insight and judgment. At the same time, the interior auditing group of the group should not only limit in financial employees, but professional employees with the knowledge of computer, engineering, technology, law, and management, and more wide management technologies should be grasped, to make the knowledge structure of the interior auditing be more reasonable. When large-scale group company establishes the interior auditing institution, the interior auditing group should come from not only professional interior auditors, but also other professionals such as legal adviser, engineering technician, economic engineer, statistician, computer engineer to form the join force.

References

Guo, Haiyan. (2004). Development Tendency and Countermeasures of Interior Auditing of China. *Journal of Heibei University of Economics and Trade*. No.6.

Li, Hanghui. (2005). Perfecting the Interior Auditing of Enterprise Group. *Development Research*. No.5.

Song, Weimin. (2005). Problems and Countermeasures of Interior Auditing of China at the Present Stage. *Friends of Accounting*. No.4.

Zhang, Qiaoliang, Zhang, Lei & Xu, Yuejun. (2005). Study on the Value Increment Function of Interior Auditing. *Friends of Accounting*. No.4.

Efficiency Examination of Turkish Airports with DEA Approach

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Abstract

In this paper, 40 airports in Turkey were examined with the help of Data Envelopment Analyze (DEA) Model and it was aimed to measure the activities of year 2008. For this purpose, operation expenses, number of personnel, flight traffic and number of passengers were taken as input variables, whereas number of passengers/area, flight traffic/runway, total load and operation expenses were taken as output variables. The analysis was solved with DEA Solver and it was concluded that the most effective airports were Istanbul Atatürk, Antalya, Denizli Çardak, Sinop, Kayseri Malatya and Van F.Melen Airports.

Keywords: Effectiveness, DEA, Airports

1. Introduction

Air transport industry is one of the most important industries of the world. It began to manifest itself at the beginning of the 20th century, and continued its development rapidly after technical improvements in particular. The development as well as achievements in technique and services in air transport is the most critical auxiliary in the progress of modern societies. After the flight of the first jet engine plane in 1949, commercial air transport grew more than 70 times. This unmatched growth has been the basic factor of economic development.

Air transport industry, which is one of the industries that has made great contribution to economic and social development of societies, has a very dynamic structure. The fast, safe and cushioned transportation that it provides increases the demand for its services on a daily basis; along with developed economic and social changes, privatization, commercialization, and liberalization have affected not only the air transport system but also the airports, which is its the most important element. As service industry investments, airports do not just meet transportation needs within these understandings; they have turned into investments that make business and generate income within the framework of their service range, and serve in a competitive environment with the awareness of the benefits that being an important transfer centre in the international transport network would bring. The best way for these investments to go forward in this change is to monitor their own performance and compare it with those of similar airports.

An examination of the studies on airports about performance and efficiency reveals that the most widely used technique was Data Envelopment Analysis (DEA) and effectiveness of 40 Turkish airports for the year 2008 was measured with input-oriented DEA method.

2. Effectiveness and Efficiency Measurements

Effectiveness and efficiency are among the most important concepts that establish the foundations of modern management philosophy. However, when several problem areas related to the evaluation of management process are taken into account, in most cases measuring performance becomes harder due to the lack of reliable and valid measurement techniques that have become standardized. It is even more difficult in the service industry compared to manufacturing industry as it includes hard-to-measure outputs such as service quality and customer satisfaction.

Today performance concept is gaining importance in especially the services industry. In most general terms, operation performance can be defined as the rate of success obtained by a business in a given period of time. In other words, performance is the qualitative and quantitative expression of the point reached by an individual, group or enterprise as measured against the inputs used for the aimed target. DEA, which is a method without parameter, is the most frequently used effectiveness measurement method; it is a technique with linear-programming base which aims to measure the relative performance of decision-making units. DEA determines the situation of the rate of mathematical total weighted outputs to mathematical total weighted inputs in terms of unit efficiency against the

limit which represents best performance. This approach was first developed by Farrel and then improved by Farrel and Fieldhouse.

3. Review of Literature

The issue of measuring and improving performance at airports has attracted the attention of several researchers in the world. Quite a lot of studies exist in this area.

In their study dated 1997, Gillen and Lall evaluated efficiency and performance using the data of 21 USA airports belonging to years 1989 to 1992. Terminal effectiveness has 6 inputs, namely number of runways, number of gates, terminal area, number of employees, number of baggage conveyors and passenger parking area, and 2 outputs, namely number of passengers and size of cargo in tons. In addition, 4 inputs, namely the airport area, number of runways, area of runways and number of employees, and 2 outputs, namely air transport activities and direction activities were handled in order to measure the performance of activities at airports. An output-oriented system was used in the study and effort was made to explain the changes between airports depending on time in performance.

Martin and Roman (2001) used data envelopment method in order to evaluate the performance of Spanish airports before privatization. Based on 1997 data 37 airports in the country were assessed. In the article, the inputs were given as expenses related to workmanship, capital and material, whereas air transport activities, number of passengers and size of cargo in tons were given as the outputs. Number of runways, number of gates, terminal area and number of employees were not used due to insufficient data. In effectiveness evaluation process, it is also important to examine how effectiveness developed in time. For this purpose, Malmquist Total Factor Effectiveness index, which includes time dimension, was developed. This index is used for measuring efficiency in time. Melchor and Carmen (1999) examined airport effectiveness in Spain with Malmquist index.

Francis et al. (2002) examined 200 airports in their study and investigated the validity and structure of applications in airports with the help of a survey applied to managers. Humphreys and Francis (2002) examined the changing structure of airport performance indicators so as to measure the current and future airport performance.

Pels et al. (2001) used DEA to examine air transport activities and passenger activities by determining the relative effectiveness of European airports between 1995 and 1997. Pels et al. (2003) investigated the inefficiency and scale economies in operation of European airports. In their article, physical capacity data were also included, but it was stated that environment-related capacity data and delay in schedule data were not available and therefore used.

Adler and Berechman (2001) developed a model so as to determine the relative effectiveness and quality of airports. In the literature, previous studies used subjective data of passengers, whereas this study ued definitions made by airways. In evaluation part of the study it was concluded that average of statistical analysis was a function of quality factors and airports. In this study, DEA and basic components analysis method was used so as to determine the relative quality level of airports. Fernandes and Pacheco (2002) aimed to obtain maximum output with their BCC model. The researchers examined 35 airports in Brazil and defined the inputs as apron area, exit area, number of entry check points, limitation façade, number of vehicle parking lots and baggage declaration, whereas the only output was defined as number of domestic terminal passengers both on and off board. In the study potential demand estimations were also made for the years 2002, 2007 and 2017. Different scenarios were derived and interpretations were made as to how effectiveness would be affected.

Pacheco and Fernandes (2003) conducted a study which handled managerial and physical dimensions so as to evaluate the 1998 performance of 35 local Brazilian airports. Researchers used BCC model in data envelopment analysis and tried to minimize inputs. The 3 inputs were determined as average number of employees, payrolls including direct and indirect benefits and operation expenses, and the 5 outputs were identified as number of domestic terminal passengers, number of cargo and mails, operation revenues, commercial revenues and financial and other revenues. In addition, a comparison was made with the conclusions of the previous study.

Bazargan and Vasigh (2003) evaluated 45 USA airports using CCR method. The inputs were operation expenses, non-operation expenses, number of runways and number of gates whereas the outputs were taken as number of passengers, number of air transport activities, number of other activities, aviation revenues, non-aviation revenues, and percentage of timely operations.

Holvard and Graham (2004) examined the British airports with data envelopment analysis method. Oum et al. (2002) compared 50 major airports in Asia, Pacific, Europe and North America in terms of their productive efficiencies by first calculating Total Efficiency Factor (TEF), then analyzing the TEF with regression models and finally by subtracting the factors which were not under control of the management. According to the results of this study, major airports are expected to obtain higher TEF values due to their economic indicators in aviation operations;

however, this does not mean that they are more effective than smaller airports. It is expected that airports with higher international traffic percentage will have lower TEF values.

A study on Taiwan measured physical effectiveness of 14 local airports in the case of existence of environmental impacts and unwanted outputs (Yu, 2004). The study was designed as output-oriented and covers managerial and physical values. In this model inputs were determined as runway area, apron area, terminal area and number of routes of each airport. The outputs were defined as the number of flight traffic activities, number of passengers and, as an unwanted factor, the noise produced by planes.

Based on the data of 5 years, Sarkis and Talluri (2004) evaluated the performance of 44 airports in the USA using multi-criteria non-parametric models. The inputs of this study were airport operation expenses, number of employees in the airport, number of gates and runways. The outputs were operational revenues (parking fees, landing fees, user fees, commercial development revenues and charter revenues), passenger flow, commercial aviation activities and total cargo transfer. In this study results were obtained according to CCR and BCC effectiveness scores and interpreted. It was concluded that studies in the future would yield more realistic results by taking into consideration the impact of weather conditions and/or privatization.

A study conducted on 67 Japanese airports with data of year 2000 aimed at measuring input-based effectiveness (Yoshida and Fujimoto, 2004). The inputs in this study were the length of runway, size of terminal, transport expenses and number of employees, whereas the outputs were passenger density, cargo carriage, and flight activities. In this study it was concluded that airports with bigger terminals and less users had lower effectiveness scores.

This literature search found out that the first study which used data enveloping method for evaluating the performance of Turkish airports was conducted by Düzakın and Güçray (2001). The authors examined the privatization of the biggest and state-run airway company of the country. They emphasized that operational effectiveness of airports would be important for potential buyers and mentioned that it would be necessary to reorganize airports for this purpose. Kıyıldı and Karaşahin (2006) evaluated with DEA 32 airports which gave civilian air transport services. From the infrastructure data obtained for airports, the variables which would best reflect the infrastructure utilization capacity of airport were chosen (namely number of planes, number of aprons, number of X-ray devices and terminal usage area) and CCR model was applied; as a result, relative performance values and efficiency levels of airports were determined.

In their study in 2009, Peker and Baki (2009) examined airport effectiveness in 2007 using DEA. In this study 4 inputs and 2 outputs were employed and 5 of 14 major airports and 2 of 23 small airports were found as "effective".

Performance evaluation of Turkish airports according to their financial values was examined in a master's thesis (Kuyucak, 2001). Moving from the input-output charts of airports, defined ratios were examined and interpretations were made on which airports would provide the best investment opportunities.

4. Methodology of The Study

4.1 Purpose of the Study

The basic purpose of this study is to measure the 2008 effectiveness of 40 airports in Turkey. In addition, another purpose is to calculate the extent to which inputs would be decreased or outputs would be increased so that the airports which are not or cannot be effective can reach the effectiveness limits.

4.2 Method Employed in this Study

In an intense and chaotic competitive environment, firms have to measure their effectiveness levels so that they can see their present situation in the industry and create a more effective management by estimating the future. Measurements show how efficient the firms use their resources and give them the opportunity to evaluate their competitive positions compared to their competitors. Such measures as effectiveness, efficiency, profitability and growth are used in evaluation of organizational performance.

CCR model is the first ad basic DEA model developed by Charnes, Cooper and Rhodes (1978) based on the idea of effectiveness. CCR calculates total effectiveness by accumulating the technical effectiveness and scale effectiveness of a unit in a single value. Although other models were developed, CCR is still the most widely used and recognized model. CCR model, which aims at output maximization, is given below:

Objective function $\quad Mak\ \mathrm{h}_k = \sum_{r=1}^{s} u_{rk} Y_{rk} \qquad 1 \le k \le m\ ,\ \mathrm{k} \in R$

Constraints $\qquad \sum_{r=1}^{s} u_{rk} Y_{rj} - \sum_{i=1}^{m} v_{ik} X_{ij} \le 0 \quad \mathrm{j}=1,2,...,\mathrm{N}$

$$\sum_{i=1}^{m} v_{ik} X_{ik} = 1$$

$$u_{rk}, v_{ik} \geq \varepsilon \qquad \text{r=1,2,...,s} \quad \text{i=1,2,....,m}$$

h_k: effectiveness of decision unit k

u_{rk}: weight of decision unit k for outputs r

v_{ik}: weight of decision unit k for inputs i

Y_{rk}: r.output value of decision unit k

X_{ik}: i.input value of decision unit k

Y_{rj}: r.output value of decision unit j

X_{ij}: i.input value of decision unit j

ε: a numeric value very close to zero

BCC model was developed by Banker, Charnes and Cooper (1984) and measures technical effectiveness under the assumption that revenue varies according to scale. If the revenue is stable according to scale, a comparison of effectiveness reveals a situation with lower performance, as the decision-making unit has to have both technical and scale effectiveness so as to reach 1 effectiveness value. In case of revenue varying according to scale, a unit with no scale effectiveness can be above the effectiveness limit as "the best observation" if it has technical effectiveness. As a result, it can be said that for the same decision-making unit, technical effectiveness measure is lower at stable revenue case than at varying-according-to-scale case. BCC model, which aims at input minimization, is given below:

Objective function
$$Mak \ h_k = \sum_{r=1}^{s} u_{rk} Y_{rk} - u_0 \qquad 1 \leq k \leq m \ , k \in R$$

Constraints
$$\sum_{r=1}^{s} u_{rk} Y_{rj} - u_0 - \sum_{i=1}^{m} v_{ik} X_{ij} \leq 0 \quad \text{j=1,2,..., N}$$

$$\sum_{i=1}^{m} v_{ik} X_{ik} = 1$$

$$u_{rk}, v_{ik} \geq \varepsilon \qquad \text{r=1,2,...,s} \quad \text{i=1,2,....,m}$$

CCR model measures total effectiveness under stable revenue assumption, whereas BCC model measures technical effectiveness by comparing units with similar scales based on the assumption that revenue varies according to scale. In this case effectiveness (E) is expressed as below:

$$E_{CCR} = E_{Scale} * E_{BCC}$$

4.3. Scope of the Study and Variables

In order to be able to apply DEA, decision-making units should be chosen, inputs and outputs should be determined, effectiveness values should be found and obtained results should be evaluated.

The study took the year 2008 as examination period. It was aimed to find the effectiveness of airports and potential changes in effectiveness in this period. Forty airports in Turkey were taken as decision-making units, which are shown in Annex-1. Data belonging to decision-making units were obtained from the web site of Directorate General of State Airfields. However, the airports in Turkey can be grouped into categories as big airports, which have annual 50.000 and above passenger capacity, and small airports, which have annual passenger capacity below 50.000. In this study all airports were examined under the same category as they were evaluated under common inputs and outputs, but the analytical findings were also evaluated separately.

Insert Table 1 here

Determination of inputs and outputs belonging to the decision-making units which will be used in the analysis is highly important, as changing the chosen inputs and outputs causes differentiation in effectiveness scores. Several decision-making units might not be effective in other studies. Minimum decision-making unit recommended by Banker should be at least 3 times of the total number of inputs and outputs. In this study 4 input and 4 output

variables will be used and the data of 40 airports will be used as decision-making units. Table 1 gives the details of inputs and outputs used in this study.

Insert Table 2 here

In this model, when variables were chosen those variables which had the most appropriate correlations among available data were determined. It was preferred to leave out those input variables which were strongly correlated with each other and output variables. Table 3 gives correlation matrix of variables and table 4 provides the definitive statistics of these variables.

Insert Table 3 here

When the correlation matrix is examined, it can be seen that flight traffic variable, which is an input variable, is strongly correlated with output variables. Linear relation with flight traffic/runway variable was 0.9665, with total cargo was 0.9553 and operational revenues was 0.9720; likewise, the number of passengers variable reveals 0.9401, 0.9738 and 0.9874 linear relation with flight traffic/runway, total cargo and operational revenues, respectively. Input and output variables did not reveal important correlation in their own groups, either.

Insert Table 4 here

4.4. Analytical Results and Evaluation

Input-oriented DEA effectiveness figures for airports obtained by DEAP V.2.1 program are given in table 5 below. CCR models give total effectiveness values and BCC models give technical effectiveness. Technically-effective decision-making units show that, within the available technology and technological change, maximum output is obtained by using a given input combination or a given output combination is produced by using minimum inputs. If a technically-effective decision-making unit suffers from ineffectiveness caused by scale, the total result turns out as ineffectiveness as well.

Insert Table 5 here

As a result of the analysis, it can be seen that İstanbul Atatürk, Antalya, Denizli Çardak, Sinop, Kayseri, Malatya and Van Ferit Melen airports are effective. Compared with previous studies in this area, it has been observed that İstanbul Atatürk, Kayseri and Antalya airports were found as effective airports. In addition, Peker and Baki found Malatya and Denizli Çardak as effective airports. Adana and Trabzon airports are technically effective but they are not operated at proper scale which results in total ineffectiveness.

It can be seen that Ağrı and Isparta S.Demirel airports are operated at proper scale but are technically ineffective, which means that heir resources are not effectively employed. It can be understood that Balıkesir, Merzifon and Uşak airports are neither operated at proper scale nor they can use their resources effectively.

Ankara Esenboğa, İzmir A.Menderes, Erzurum, Gaziantep, Diyarbakır and Erzurum airports and Bursa Yenişehir, Çanakkale, Elazığ, Konya and Mardin airports are operated at proper scale but they cannot make effective use of their resources; thus, although they come close to technical effectiveness, they cannot be totally effective.

When potential improvements are examined, this gives the decrease needed in inputs (or the increase in outputs) by ineffective airports in order to reach effectiveness limit, it can be seen that effectiveness score of, say, Gaziantep aerodrome is 0.87, flight traffic idleness value is 17.56 and personnel number idleness value is 9.34. Accordingly, this airport will be effective if it increases flight traffic by 17.56% and decrease personnel number by 9.34%.

5. Conclusion

The increase in the number of airway companies as well as the comfort and time-saving in air transport made airport business an attractive one. For developing countries like ours whose resources are limited, effective operation of airports which cost lots of money is highly important, as airports have to be operated effectively so as to make it a profitable business. For this purpose, efficiency of airports should be controlled by making capacity usage analysis in regular intervals and new operation strategies should be adopted according to the obtained results.

Airports constitute the most complicated part of air transport system; they are the places where interest groups which are interacted with each other come together physically. As air transport provides fast, reliable and comfortable travel, people prefer air transport more and number of passengers increase on a daily basis. It is impossible for the airports to respond to this increase by renewing their infrastructure at the same pace. For this reason, performances of physical and workforce infrastructures required to meet the expectations of passengers should be monitored with "continuous improvement" philosophy so that current capacities of airports can be utilized at maximum level and users can obtained better service at higher quality. Performance of airports must be compared not only with their past performance but also with the performance of similar airports. Future studies might

concentrate on examination of the change in effectiveness of all airports in years and compassion of international airports with similar characteristics.

References

ATAG. (2005). *The Economic and Social Benefits of Air Transport*, [Online], Available at: http://www.atag.org/files/Soceconomic-121116A.pdf ,(Accessed: 10 June 2010).

Banker R.D. (1992). Estimation of Returns to Scale Using Data Envelopment Analysis, *European Journal of Operations Research,* 62, pp. 74-84.

Bazargan M. and Vasigh B. (2003). Size Versus Efficiency: A Case Study of US Commercial Airports, *Journal of Air Transport Management*, Volume 9, Issue 3, pp.187-193

Boussofiane A., Dyson R. and Rhodes E. (1991). Applied Data Envelopment Analysis, *European Journal of Operational Research*, Volume 2, Issue 6, pp. 1-15.

Cooper W.W., Seiford M.L. and Tone K. (2000). *Data Envelopment Analysis*, New York: Kluwer Academic Publishers

Düzakın E, & Gucray A. (2001). An Analysis of The Efficiency of Airports in Turkey. (OR 43) *43th Annual Conference of the Operational Research Society Abstracts,* Bath, United Kingdom, 9/4 to 9/6.

Gattoufi S., Oral M.,Reisman A. (2002). Data Envelopment Analysis Literature: A Bibliography Update (1951-2001).[Online], Available at: http://bilmer.sabanciuniv.edu/elit/gsm/sugsm02_08.pdf (Accessed: 22 July 2010)

Gillen D., & Lall A. (1997). Developing Measures of Airport Productivity and Performance: An Application of Data Envelopment Analysis, *Transportation Research Part E: Logistics and Transportation Review*, 33(4). pp.261-273.

Holvad T. and Graham A. (1997). Efficiency Variations for European and Australian Airports, *39th Annual Conference of the Operational Research Society*, Bath, United Kingdom, 9/9 to 9/11.

Humphreys I. and Francis G. (2002). Performance Measurement: A Review of Airports, *International Journal of Transport Management*, Volume 1, Issue 2, pp.79-85

Kocakalay S. and Isık A. (2003). Data Envelopment Analysis, *Journal of Institute of Science and Technology,* University of Dumlupınar, Issues 5, pp.163-171.

Kuyucak F. (2001). Performance Analysis of Airports in Turkey and Suggest a model for Airports in Turkey, *Journal of the Institute of Social Sciences*, University of Anadolu, p.161.

Martín C.J. & Román C. (2001). An Application of DEA to Measure The Efficiency of Spanish Airports Prior to Privatization, *Journal of Air Transport Management*, 7(3). pp.149-157.

Pacheco R. R. & Fernandes E. (2003). Managerial Efficiency of Brazilian Airports, *Transportation Research Part A: Policy and Practice*, 37(8). pp.667-680.

Peker I. and Baki B. (2009). Application of Data Envelopment Analysis of the Relative Efficiency and Turkey Airports, *Journal of the Institute of Social Sciences*, University of Çukurova, Volume 18, Issues 2, pp. 72-88

Sarkis J. (2000). An Analysis of the Operational Efficiency of Major Airports in the United States, *Journal of Operations Management*, 18(3). pp.335-351.

Sarkis J., & Talluri S. (2004). Performance Based Clustering for Benchmarking of US airports, *Transportation Research Part A: Policy and Practice*, 38(5). pp.329-346.

Web site of Devlet Hava Meydanları Isletmesi, [Online], Avaliable at: http://www.dhmi.gov.tr. (Accessed: 15 July 2010)

Table 1. Big and Small Airports Used In The Analysis

Big Airports	Small Airports
İstanbul Atatürk*	Adıyaman
Ankara Esenboğa	Ağrı
İzmir A.Menderes	Balıkesir
Antalya	Bursa Yenişehir
Adana	Çanakkale
Kayseri	Denizli Çardak
Trabzon	Elazığ
Van F.Melen	Erzincan
Diyarbakır	Gaziantep
Muğla Dalaman	Hatay
Erzurum	Isparta S.Demirel
Samsun Çarşamba	K.Maraş
Milas Bodrum	Kars
Malatya	Konya
	Körfez
	Mardin
	Merzifon
	Muş
	Nevşehir Kapadokya
	Siirt
	Sinop
	Sivas
	Şanlıurfa
	Tekirdağ Çorlu
	Tokat
	Uşak

*: İstanbul Sabiha Gökçen Airport was excluded from analysis as its data were problematic.

Table 2. Definition of Inputs and Outputs

Inputs	Details
Operational expenses	Total expenses made on materials, personnel, benefit services, taxes, duties and depreciation by airports in one year
Number of personnel	Number of people employed in an airport in one year
Annual flight traffic	Maximum number of planes that airports can serve in one year
Number of passengers	Number of passengers that airports can serve in one year
Outputs	**Details**
Number of passengers/area	The annual number of passengers per each square meter was found after calculating the areas open to passengers in the airport
Total flight traffic/runway	Total weight of cargoes, mails and baggage carried at the aerodrome in one year
Total cargo traffic	Amount of total flight traffic per number of runways at the airport throughout the year
Operational revenues	Total revenues obtained from airway companies in exchange of the air travel and terminal services provided by the airport throughout the year.

Table 3. Correlation Matrix

	Operational expenses	Number of personnel	Flight traffic	Number of passengers	Number of passengers/ area	Flight traffic/ runway	Total cargo	Operational revenues
Operational expenses	1.0000							
Number of personnel	0.7524	1.0000						
Flight traffic	0.6829	0.7498	1.0000					
Number of passengers	0.8778	0.7291	0.8570	1.0000				
Number of passengers/area	0.1263	0.2124	0.1521	0.1329	1.0000			
Flight traffic/runway	0.7234	0.8146	0.9665	0.9401	0.2178	1.0000		
Total cargo	0.5201	0.7863	0.9553	0.9738	0.3856	0.9335	1.0000	
Operational revenues	0.8103	0.8495	0.9720	0.9874	0.4547	0.8485	0.9296	1.0000

Table 4. Definitive Statistics for Turkish Airports

Definition	Inputs				Outputs			
	Operational expenses	Number of personnel	Flight traffic	Number of passengers	Number of passengers/area	Flight traffic/ runway	Total cargo	Operational revenues
Average	12.574,84615	169,4359	17.588,79	1.922.265	141,4941	8.672,653846	39.349,20513	30.578,51282
Standard deviation	17.871,65644	237,2546	48.609,35	5.417.161	118,8728	16.967,75151	137.084,9065	106.490,9948
The highest	83.241	1.115	276.148	28.553.132	443,0226	92.049,33333	783.209	581.060
The lowest	1.077	22	97	6882	3,208392	97	127	32

Table 5. Effectiveness Scores of Turkish Airports

AIRPORTS	CCR	BCR	SCALE EFFECTIVENESS
Adana	0,85	1,00	0,97
Adıyaman	0,31	0,45	0,69
Ağrı	0,26	0,26	1,00
Ankara Esenboğa	0,93	0,96	0,97
Antalya	**1,00**	**1,00**	**1,00**
Balıkesir	0,10	0,28	0,36
Bursa Yenişehir	0,75	0,83	0,90
Çanakkale	0,65	0,69	0,94
Denizli Çardak	**1,00**	**1,00**	**1,00**
Diyarbakır	0,85	0,87	0,98
Elazığ	0,58	0,62	0,94
Erzincan	0,32	0,39	0,82
Erzurum	0,74	0,76	0,97
Gaziantep	0,87	0,90	0,97
Hatay	0,38	0,43	0,88
Isparta S.Demirel	0,45	0,45	1,00
İstanbul Atatürk	**1,00**	**1,00**	**1,00**
İzmir A. Menderes	0,85	0,93	0,91
K.Maraş	0,45	0,56	0,80
Kars	0,53	0,59	0,90
Kayseri	**1,00**	**1,00**	**1,00**
Konya	0,65	0,68	0,96
Körfez	0,20	0,33	0,61
Malatya	**1,00**	**1,00**	**0,95**
Mardin	0,83	0,88	0,94
Merzifon	0,17	0,29	0,59
Milas Bodrum	0,65	0,66	0,98
Muğla Dalaman	0,59	0,78	0,76
Muş	0,23	0,35	0,66
Nevşehir Kapadokya	0,16	0,22	0,73
Samsun Çarşamba	0,73	0,75	0,97
Siirt	0,32	0,40	0,80
Sinop	**1,00**	**1,00**	**1,00**
Sivas	0,58	0,66	0,88
Şanlıurfa	0,60	0,61	0,98
Tekirdağ Çorlu	0,68	0,69	0,99
Tokat	0,35	0,43	0,81
Trabzon	0,92	1,00	0,96
Uşak	0,19	0,22	0,86
Van Ferit Melen	**1,00**	**1,00**	**1,00**

Annex-1: Data Set of Model

Airport	Operational expenses	Number of personnel	Flight traffic	Number of passengers	Number of passengers/ area	Flight traffic/ runway	Total cargo	Operational revenues
Adana	19.105	352	26.269	2.290.427	443	26.269	32.855	18.210
Adıyaman	2.511	48	916	86.280	144	916	786	258
Ağrı	3.015	54	649	60.360	132	649	680	203
Ankara Esenboğa	60.333	1.115	62.859	5.692.133	70	31.430	72.887	40.141
Antalya	49.625	527	128.753	18.789.257	161	42.918	380.360	345.560
Balıkesir	1.077	22	97	17.399	116	97	153	141
Bursa Yenişehir	10.224	107	2.120	75.462	13	1.060	925	475
Çanakkale	2.389	41	1.214	21.259	29	1.214	167	181
Denizli Çardak	6.451	71	1.713	157.361	24	1.713	1.131	980
Diyarbakır	6.749	98	7.649	967.088	361	7.649	10.141	4.578
Elazığ	5.352	106	1.588	135.293	223	1.588	1.655	563
Erzincan	5.525	56	1.490	91.540	115	1.490	1.100	451
Erzurum	10.489	153	4.842	527.598	92	2.421	5.492	283
Gaziantep	16.087	177	7.116	754.968	198	3.558	8.012	3.391
Hatay	5.117	37	1.470	162.128	360	1.470	1.841	492
Isparta S.Demirel	4.362	70	1.654	15.053	11	1.654	265	381
İstanbul Atatürk	83.241	858	276.148	28.553.132	227	92.049	783.209	581.060
İzmir A. Menderes	49.082	637	52.014	5.455.298	92	26.007	75.377	53.410
K.Maraş	3.580	60	1.002	68.167	126	1.002	721	153
Kars	6.243	70	2.292	269.095	159	2.292	3.317	889
Kayseri	7.189	79	6.358	674.833	137	6.358	11.055	7.074
Konya	5.196	85	2.646	266.143	101	1.323	2.973	1.717
Körfez	2.246	48	780	120.000	121	85	153	141
Malatya	5.140	68	4.102	463.817	436	4.102	5.506	2.022
Mardin	4.142	32	1.662	192.764	262	1.662	2.140	438
Merzifon	1.142	25	170	13.888	30	170	127	33
Milas Bodrum	23.859	287	22.312	2.749.788	246	22.312	36.991	56.003
Muğla Dalaman	20.260	349	23.188	3.208.668	89	11.594	44.700	46.244
Muş	2.919	35	806	88.875	109	403	939	406
Nevşehir Kapadokya	7.964	137	1.709	100.762	40	1.709	1.320	5.691
Samsun Çarşamba	10.059	189	5.499	604.387	128	5.499	7.017	5.048
Siirt	2.119	41	346	12.581	35	346	149	148
Sinop	1.077	29	205	14.464	24	205	156	32
Sivas	4.613	50	1.352	124.357	179	1.352	1.361	482
Şanlıurfa	9.746	89	1.474	154.657	33	1.474	1.419	762
Tekirdağ Çorlu	6.423	77	11.201	6.882	3	11.201	14.339	980
Tokat	2.530	43	321	21.828	60	321	227	63
Trabzon	16.142	214	14.688	1.469.713	125	14.688	16.591	11.368
Uşak	2.543	36	432	25.305	32	432	201	101
Van Ferit Melen	6.799	84	5.637	585.319	353	5.637	6.334	2.150

A Case Study on the Business Performance Management
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Abstract

The purpose of this article is to provide organizations with an understanding about business performance management (BPM) and its potential value in China hotel industry, the paper make a study this objective in the following parts. In order to research on the business performance management is the transnational corporations in the process of the international development. Firstly, this report introduces transnational corporations, and performance management of multinational corporations. Secondly, it forms in different periods and their characteristics in business, aiming to explore and analyze the findings and examines the impacts of the performance management on management practices and employees preferred management style in Hilton Hotels Corp. Finally, the author gives some advices on an appropriate performance management style of Hotels Corp in China, on the basis of the findings of the survey. Meanwhile, it also points out the limitations of this research.

Keywords: Business Performance Management (BPM), Hilton Hotels Corp, Strategy management plan, China hotel industry, Corporate cultures

1. Introduction

The hotel industry is the important industry in China, because it has important part on not only people's life but also national economy. Since the end of 20th century, with the development of technology, the service market of hotel is developed rapidly. Hilton, which has all operations, is the provider of hotel service developed under this advantaged circumstance. Facing the capacious market of China and potential tremendous needs of data, there will be a great opportunity for the whole hotel industry, not mention to Hilton. On the market of hotels industry in China, there are many famous hotels. Although under the situation of serious competition, Hilton has not won the satisfactory market share.

Nowadays the economy globalization has become a part of the necessary requirement for enterprises to sustain a successful business operating in a competitive environment. Accordingly, global expansion of hotel operations has increasingly become a significant strategic development for big hotel corporations. As for Hilton hotel, a series of market development strategies including entering new market segments and spreading into new geographical areas are made, to capture the potential market and take the leading role in the market competition. With the rapid development of communication technology and international commodities, the acceleration of funding, technology

and personnel are continuous flow. The process of economic globalization will be further accelerated. The world economy has entered a new period of the major development and opening up, great competition, great adjustment, the integration and coordination. The multinational companies will continue to emerge, and international competition is becoming increasingly fierce. In this new historical period, talent competition gradually replace the tradition of competitive technologies and products, thus competition has become the focus of multinational companies. How to train and develop personnel and retaining talented people, and to enhance their work performance, further to enhance company performance, has become a daunting task that Hotels Corp has to face.

However, the increased globalization of hotel development has created a great challenge for the hotel corporations to recruit technically competent and culturally sensitive managers for managing the operations of overseas properties. Expatriates, employees working in a foreign location, find that culture shock can affect their general ability to function well (Hofstede, Schoeider and Bariux, 1991). A failure in an overseas posting will not only damage the manager's sense of self-respect and his/her job, but also cost the company's money (Spangengerg, 1992). Hence, cultural understanding and adaptability have been identified as contributing to better expatriation. After the economic reform, many international hotel chains came to China and found the local hotel personnel were not qualified enough to occupy senior management positions in their Chinese properties. So with the increase of foreign investment, a large amount of expatriate managers have been assigned to China and are still at high posts in the joint-venture corporations.

2. The business performance management of Hilton Hotels Corp

Business Performance Management (BPM) is one of the significant topics in industry today (Miranda, 2004). The objectives and indicators of BPM are then associated with operational metrics and linked to performance incentives, which lead to effective strategy execution throughout the organization. BPM involves an array of integrated operational and analytical processes that accomplish two sequential tasks. First, it facilitates the creation of strategic goals by stipulating specific objectives and key performance indicators that are meaningful to the organization. Second, it supports the subsequent management of the performance to those goals (Iervolino 2004). The BPM is without best model, while a perfect performance management program may be adapted to a company, another company may not necessarily produce good results. There is a huge difference among International Business Performance Management. The multinational companies choose more complicated and important model in making performance management (Hartlen, 2004). BPM is a consolidation of concepts that companies have been practicing for some time, such as data warehousing, business intelligence, and total quality management. In an effort to provide clarity to the industry, a BPM standards group was established in 2003. They define BPM as a set of integrated, closed-loop management and analytic processes, supported by technologies that address financial and operational activities. BPM helps businesses define strategic goals and measure and manage performance against those goals (Whiting 2004).

An in-depth interview method based on the BPM theory was used to Hilton Corp in China. It hopes that through the in-depth analysis and application of the theory of transnational corporations of the outstanding performance management mode of operation of transnational corporations' in China for performance management problems. In the analysis of transnational corporations the thesis seeks the effective implementation of performance management and promoting transnational corporations and raising the level of performance management. For the operation of transnational companies in China, China's development and expansion of multinational corporations, international companies will contribute to the depth of human resources development.

3. Background study of Hilton

Today, there are only nine companies whose room counts exceed the 100,000 barrier. Yet, in 2008, those nine giants now control 2.98 million of the world's hotel rooms, while the 10 biggest companies controlled a smaller amount, 2.84 million rooms in 2005. As a famous international hotel corporation, Hilton Hotels Corp. has bough tone of the largest hotel franchisors in the world and saw its room count soar 241%, from 85,000 to 290,000. The ranking of Hilton Hotels Corp. in the list of top300 Hotel Corporation shifted from 11th in 2005 to 3rd in 2008. Through two brand acquisitions and aggressive organic growth, Hilton Corp. has increased its rooms' inventory by 21.6%, crossing over the 300,000 mark for the first time. Hinton international operates five hotels in China (2405 guest rooms). They are Hilton Beijing, Hilton Chongqing, Hilton Dalian, Hilton Nanjing, and Hilton Shanghai. (Hilton worldwide, 2010)

Hilton Hotels Corporation is a hotel/ lodging company that is spread world wide. Hilton strives to maximize productivity and increase shareholder's value. Hilton is in the hotel/ casino industry. Being at the top of the industry, Hilton strives to improve upon their sales, stock price and overall effectiveness. This strategy capstone describes in great detail the Industry Analysis, Company Analysis and suggestions for Hilton Hotels. Hilton has proved to be the

fastest growing company in the hotel/ lodging industry. They have overall out performed their main competitors. Hilton is just behind choice hotels in their market capitalization compound annual by one percent. Hilton has grown 22 percent compounded annually over four years. Marriott is behind Hilton with a 15 percent CAGR. Market capitalization is a good way to show the growth of a company because it incorporates the stock price as well as the amount of shares outstanding. With excellent management and quality staff Hilton will continue to be at the top of the industry (Tourism Report, 2010).

Higher maturity of the markets in the United States and Hilton hotel experienced multinationals long-term development, and formed a kind of the sound human resource management. Under the impact of traditional culture and management style, they are only the result of heavy work. However, with the development of management theory, the assumption that human nature change, the enterprise's human resources management has entered a period of rapid development, especially in human resources management pattern produced the earliest and the most completed development in the United States, which has produced many revolutionary management thinking. In the performance management it has also made many innovations, the emergence of a new performance management model and management tools, such as performance evaluation of the KP model, BSC balanced scorecard management mode, 360 performance evaluation model (Edwards and Ewen, 2004), and the rise of the promotion in the level of performance management.

In the performance management of the Hilton, it has two distinct characteristics, namely strict system and matures methods of operation. The hotels and business performance management system, classification and meticulous, for example, the basis of performance management-posts statement, as it is defined in the positions of power and responsibility. It is not only a detailed description of the content of posts, but also defines the powers and the corresponding positions, which should bear the responsibility of making post brochures enterprise performance management as an effective basis for such enterprises strict system and it will be detailed to guide enterprise performance management. The mature methods of operation will make easier to achieve good performance management effectiveness and the enterprise performance objectives. While the mature extension is under the guidance of enterprise management, the staffs of the hotel will be able to better target segment to the various organizations, departments and posts. In the performance of this assessment, it will be easier to quantify performance indicators to assess performance with more science and more viable (Murphy and Clevelen, 1991).

4. Hilton's performance management model

As for the management of personnel, as well as the evaluation of soft factors, it has been the difficulty of performance management. Hilton hotel will start gave management personnel, leading officers to establish a code of conduct, code of conduct is open to the public. Based on these management staff code of conduct, control their behavior, we can clearly understand and know what areas we have done well, there is a gap between what. Staffs can also act in accordance with criteria to evaluate the management effectiveness of management staff. As for the staff of the corporate culture identity, values, and so the examination of soft factors, Hilton's approach is to work in advance, the first to be informed of the Hilton values, and values and then there will be relevant training, the staff of the values sentiment will continue to be strengthened, and then use occurred in the company's staff to explain the facts of the values in every assessment is also a conclusion must be proved by facts, and never figment of the imagination, make a reasonable assessment, scientific and feasible . As for the Hilton hotel among the enterprise performance management models, it has the typical representation of United States performance management. Hilton's performance appraisal system is the most important management classic representative from generic performance management system, performance management; the implementation process can be seen from the world's top multinational corporation's performance excellence households in the show. Hilton's performance management is a systematic project (inspectors, performance assessment, performance management system design from six yards of management, career development, and other supporting staffs of the perfect system, the letter to sleep, the timely feedback) (Travel courier, 2010).

Hilton also stresses that with the company's values, management and the active participation of the general staff, such as the good performance of the operating environment create, which are included in the company's performance management system of the Hilton hotel-performance goals and is zoned for the development of performance management is the foundation of the tomb. The subject must be developed in line with the principle that is clear, measurable, achievable and realistic. The personnel department has agreed to maintain the basis of the repeated communication with the staff weighed on the development of performance plans implemented on the basis of performance assessment. Hilton's performance assessment and evaluation process into the year-end appraisal. In the performance appraisal process and the timely implementation of the scheme's performance counseling, the staff performance should be a good chance on sure for the poor performance of staff, a timely reminder to help correct to facilitate the achievement of performance targets, but also for the year-end appraisal accumulated data. The year-end

appraisal of the corporate performance assessment links most important aspect of their assessment, mainly through self-identification, based on the two evaluation processes to implement.

The first is the self-identification of the staffs, mainly through personal qualifications fill out records, personal records and the completion of the year to a record completed, followed by the manager of evaluation, staff personal information manager on the basis of self-evaluation, the staff filled out a record of performance appraisal, managers must complete the identification of communication with staff, the unanimous opinion. If managers and employees have different views, we must have sufficient reasons to convince the other side. If the evaluation of the staff of the manager have different views, employees can communicate with the manager, but we must use facts to speak; if employees can convince managers, managers can amend their previous evaluations. If the two sides can not be reached, it will be to deal with a higher manager. In the mutual communication and exchange, we must use facts to prove their point of view, and we can not imagine any reason. Assessment of the application of the results will also affect the implementation of corporate performance results. The Hilton's assessment results not only in staff salaries and related performance results will be used in staff training, promotion, and changing the guard, and other fields, with staff career development are closely linked. The Hilton's performance results of the processing management are divided into four types: Selection, Training and developing the potential staff, Resignation, Promotion and rewards.

5. Suggestions

Business Performance management of international companies are involved in research on the management, psychology, organizational behavior, statistics, the international human resources development and management, and other disciplines of knowledge. Thus, it also has strong practice and the researchers need a deeper theoretical knowledge and in-depth understanding of performance management practice in the multinational companies. The author initially covers the areas of research in the above topics. In the future study and work in practice, the author will continue to make efforts to explore, more in-depth study relevant aspects of the theory, and focus on practical experiences related to the accumulation of transnational corporations to improve the performance management study. In near future, more foreign capital will be invested to china service market permitted. Therefore, Hilton will have to face the fierce competition. At this critical time, facing the opportunity and threat, how to solve the problems existed in management and which strategy taken by Hilton, which can be used to build up its corn competition and enlarge its market share, will determine its fate. As for Hilton's assets and liabilities rate, there is space to use increasing equity multiplication to obtain the interest of tax shelters, but its managers should weigh the pros and cons between the benefits and the financial risk to make reasonable decisions.

After entering the 21st century, the globalization of the world economy and the knowledge economy are the two major characteristics of the rapidly growing wave in the world economy, the cross-border business has become all the only way for Hilton to develop. Multinational human resources management staffs have begun to focus on the development of the basis of this sign for the development of enterprises. Therefore, in order to promote staff, improve organizational performance and achieve common development, the enterprises and employees pay attention to the performance management in the new human resources management issues. The rapid development of performance management produced in the 1980s based on the theory and practice abroad, has achieved considerable results. However, in China, research on performance management start in the late 20th century until the late 1990s began to be heard. As the theory in the Western culture-specific management, performance management, because of different values, leadership model, and personal needs vary, and performance management of multinational companies face a complex environment, the company has become a human resources management of a problem. The managers of transnational corporation's performance management give full consideration to multinational corporation's special environmental factors.

5.1 strategy management plan

Through the survey of factors related to multinational companies have human resources management and performance management status of first-hand information, and profoundly analyze the outstanding performance management mode of operation of transnational corporations, to identify the problems, identify gaps and, based on this, carefully draw performance management of the justifications. The multinational companies are seeking an effective performance management modes and roads, with a view to addressing the practice of transnational corporations' performance management issues and make a breakthrough contribution. International business companies operating in the face of a huge difference in the global market, its performance management system is large and complex system, a scientific and reasonable, appropriate and effective performance management system, not once on the 1st to establish, much less an offer and on, it is a continuous improvement, and gradually perfect the gradual process. This is because: the level of management differences: transnational companies to enter the

operational phase does not mean that the management level of maturity, many significant achievements of the transnational corporations in human resources management, particularly in the area of performance management at the initial stage, the company's overall. The management level has yet to be improved, and this requires the management in accordance with the actual establishment of an appropriate level of performance management model to meet the needs of the development company. Therefore, enterprises should be based on reality of transnational corporations and give full consideration to business characteristics of the system in the enterprise performance. Design from the appropriate science to achieve sexual point of view, full consideration of industry, enterprise scale, development strategies, the quality of personnel, and other factors, the establishment of enterprise development for the performance management system.

5.2 Business performance management

Performance management is the organization for the achievement of organizational development strategy and objectives, using the scientific method, or groups of staff behaviors, attitude and performance level and the overall quality of the overall management, and fully mobilizes their enthusiasm, initiative and creativity of the activities Process. In short, performance management is the use of a corporate management style motivates staff to achieve personal goals, including the staff of the organization's objectives and struggle process. Incentive mechanism of selection and application of direct bearing on the effectiveness of organizational performance management, organizational development strategies can further the achievement of far-reaching implications. Based on national human resources market, the establishment of an effective performance incentive mechanism has become a performance management and gives full play the effectiveness of the necessary conditions.

Based on staff salaries implementation of performance incentives is the most fundamental one of the performance incentives. Incentive and staff Performance-related, in accordance with the performance of the corresponding level of incentive levels, and thoroughly change the traditional pay system design concepts, motivate staff incentive to work, to generate a good level of performance. Offer competitive salaries and benefits, this is the most basic incentives of transnational corporations, high-paying, high welfare incentives in the multinational companies can be found everywhere. Environment for transnational corporations is vital to the impact of factors on the performance management. Multinational companies facing the first performance management is the operating environment of the host country, the country's political, economic, cultural, customs and so the company will have an impact on performance management. Relatively speaking, a host of transnational corporations on the environment is familiar, easy to grasp the. Contacting with the customer, partners and suppliers are also localized, and the international implementation of the above issue will be involved in the strategy of multinational corporations. The transnational corporations' performance management should be placed in the environment and international environmental organizations. Under the consideration, the establishment of an appropriate performance management system and improve the environmental management system adaptability and effectiveness.

Furthermore, some transnational companies through overtime or other incentives for those who need to pay more staff to provide the opportunity to raise salaries. Performance-based pay incentive that is encouraging staff to enhance performance of transnational corporations has made the expected results. *5.3 corporate cultures*

Ecological performance management for Hilton hotel is essential to the influencing factors. The hotel performance management is the first face the host operating environment, and the country's political, economic, cultural, customs, and so the Hilton hotel will have an impact on performance management. Relatively speaking, a host of transnational corporations on the environment is familiar, easy to grasp. The performance management company it is relatively difficult part of the overseas subsidiaries faced by the market, the staff, according to the political, economic and legal environment is localized. Contacts among the customers, partners and suppliers are localized, and also will be involved in the strategy of multinational corporations. It should be placed in performance management of transnational corporations and international environment organizations under consideration. The establishment of an appropriate performance management system and improve the environmental management system adaptability and effectiveness.

The global companies enhance the success of the development by operating the staff training, share and pride. The transnational business often overlooked subsidiary company of the host countries. The huge success of the performance management system to copy subsidiary of the country's management of the environment in the operation, often occur because of cultural differences. The different values lead to ineffective performance management mechanism, thereby may be leading to overseas subsidiaries performance management failure. The phenomenon overseas subsidiaries of transnational corporations in key management personnel has dispatched by the headquarters staff of the enterprise rather outstanding. For example, lifetime employment of Japanese employees is a great honor, employees will have a greater incentive, and "lifetime employment" to improve the performance level

of American workers is minimal.

References

Edwards, M and Ewen, A, (2004). How to manage performance and pay with 360-Degree feedback, *Compensation and Benefits Review.*

Frolick, M and Ariyachandra, T. (2006). business performance management: one truth. *Business intelligence*, winter, 41-47.

Hartlen, B. (2004). Playing Politics: Debunking the Myths That Block a Successful BPM Implementation. *Business Performance Management*, June, 10–12.

Hilton worldwide (2010). http://www.hiltonworldwide.com/.

Hofstede, Schoeider and Bariux, (1991). Cultures and Organizations: Software of the Mind, McGraw-Hill.

Iervolino, C. (2004). Don't Forget the Data: Keeping the Right Focus in Consolidation and Reporting. *Business Performance Management*, June, 18–19.

Miranda, S. (2004). Beyond BI: Benefiting from Corporate Performance Management Solutions. *Financial Executive*, 20(2) 58–61.

Murphy and Clevelen, (1991). *performance management*, London: International Thomson Business Press, 93

Spangengerg, (1992). A systems approach to performance appraisal in organizations, the 25th International Congress of Psychology.

Tourism Report. (2010). Company Profiles: Hilton. *Business Monitor International*, Q3, 49.

Travel courier. (2010). Check in: Hilton. JUNE, 25.

Exchange Rate Risk Exposure of Nigerian Listed Firms:

An Empirical Examination

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Abstract

The study investigated foreign exchange rate risk exposure of 117 samples of Nigerian Listed firms for the period 1998 - 2007. The Jorion (1991) approach of measuring economic exposure as a slope coefficient of the regression of stock returns on exchange rates movements was used. The study utilized three alternative currencies exchange rates, viz; the US Dollar, the UK Pounds and the Euro effective real exchange rates. Findings reveal that Nigerian listed firms are generally exposed to adverse exchange rates risks of the three currencies under investigation, with a higher magnitude of exposure to the US dollar. The study further investigated differences in exposure by financial and non-financial sector firms. The results failed to indicate any significant differences in pattern of exposure between the financial and non-financial firms, thus providing no evidence to support the thesis that financial firms possess requisites to hedge exchange rates risks. The study concluded that exchange rates instability is significant hindrance to corporate performance in Nigerian listed firms.

Keywords: Exchange Rates, Risk Exposure, Nigerian Firms

1. Introduction

In Nigeria, foreign exchange management policies have traversed the extremes of fixed and flexible regimes with a view to preserve the value of the domestic currency, the naira; maintain a favorable external reserves position, and ensure price stability. It shifted from a fixed regime in the 1960s to a pegged arrangement between the 1970s and the mid-1980s. The fixed exchange rate regime induced an overvaluation of the naira, necessitating it's been supported by exchange control regulations that engendered significant distortions in the economy that gave vent to massive importation of finished goods with the adverse consequences for domestic production, balance of payments position and the nation's external reserves level. Moreover, the period was bedeviled by sharp practices perpetrated by dealers and end-users of foreign exchange. These and many other structural problems in the Nigerian economy necessitated the adoption of the Structural Adjustment Programme (SAP) in 1986, aimed at revamping the ailing economy, eliminate the distortions in the economy and to predispose it to sustainable growth. Under the programme, several reforms measures were designed to restructure and diversify the productive base of the economy, achieve fiscal balance and balance of payments viability, intensify the growth potential of the private sector and set the economy on the path of steady and balanced growth.

Consequent upon achieving the foregoing, foreign exchange market reforms constituted one of the main policy thrusts of structural adjustment with the adoption of a more flexible exchange rate regime. Since 1986, exchange rates management has passed through various types of the floating regime with a regime of managed float, without any strong commitment to defending any particular parity, being the predominant characteristic of the floating regime in Nigeria. The resultant effect of the foregoing has been unstable movements in exchange rates occasioned by incessant regime changes over the years. Variability in exchange rate is a major source of macroeconomic uncertainty affecting firms. The implication of considerable exchange rate fluctuations over the last three decades, which is of policy and research relevance in Nigeria, is its risk exposure to domestic agents. More specifically, it is widely believed that changes in exchange rates have important implications for financial decision-making and for the profitability of firms.

Michael Adler and Bernard Dumas (1984) define a firm exposure to exchange rate risks when its share value is influenced by changes in currency values. There are theoretically various channels through which the exchange rate might affect the profitability of a firm. Firms that export to foreign markets may benefit from a depreciation of the local currency if its products become more affordable to foreign consumers. On the other hand, firms that rely on

imported intermediate products may see their profits shrink as a consequence of increasing costs of production. Even firms that do no international business may be influenced indirectly by foreign competition. Furthermore, firms in the non-traded as well as the traded sectors of the economy compete for factors of production, whose returns may be affected by changes in the exchange rate.

The motivation for the current study is two pronged. First, while large bodies of empirical studies provide evidence for the relationship between foreign exchange rate movements and changes in the value of firms, results from these studies are diverse and inconclusive. While Many studies, have found the exchange rate exposure significant (Allayannis, 1997; Allayannis and Ihrig, 2002; Dominguez and Tesar, 2001; Griffin and Stulz, 2001; Chow, Lee and Solt, 1997), many other studies argue that the value impact of exchange rate is weak (Jorion (1991) Bodnar and Gentry (1993)

Secondly, existing studies have concentrated on large firms operating within well-developed money and capital markets of industrialized economies of US and United Kingdom. Findings from these studies becomes difficult to generalized for relatively small sized firms in Nigeria that operates within a relatively segmented and less efficient markets, especially bearing in mind the argument that in the efficient markets, the exchange rate changes do not matter, as they are absorbed instantly. Specific research studies exclusively on the subject of exchange rate exposure of firms in developing countries, especially in poor Sub Saharan African (SSA) countries remained altogether an ignored area of empirical research. The only study, to our knowledge is Zubeiru, Kofi and Adjasi (2007) for the Ghanian firms. These we argue are serious shortcomings of existing literature, and the current study fills the gap for Nigerian economy and also adds to the limited body of empirical literature on exchange rate exposure of firms in Africa. Results of this study will serve as a useful guide to corporate managers and investors on the degree of foreign exchange exposure and the need to effectively manage firm exposure.

The rest of the study is structured as follows. Section two gives a brief review of exchange rate management in Nigeria; section three reviews the extant literature on foreign exchange exposure. Section four presents the methodology adopted for the study while section five discusses the findings. Conclusions from the study are drawn in section six.

2. A Brief Review of Exchange Rate Policy in Nigeria

Following the failure of previous macroeconomic policies to turn round the economy, Nigeria adopted SAP in September, 1986, the major element of which was the pursuant of a realistic exchange rate. With the introduction of SAP, the second-tier Foreign Exchange Market (SFEM) was established. SFEM was expected to produce a market-determined exchange rate that would remove the overvaluation of the naira, which persisted in the pre-SAP era. Since 1986, various exchange rate policies, ranging from dual exchange to unified exchange rate system in 1987 were adopted. In 1994, regulation of the foreign exchange market was re-introduced with rate fixed at N22/US$1. However, because of inherent abuses and bureaucratic bottlenecks associated with regulation the system was short-lived. In 1995, the Autonomous Forex Market (AFEM) was introduced following the promulgation of Foreign Exchange (Monitoring and Miscellaneous Provisions) Decree 17 of 1995 and the abolition of Exchange Control Act of 1962. Under the AFEM, CBN was to intervene in the market as short notice.

Failure of AFEM led to introduction of Inter-bank Foreign Market (IFEM), a pre-cursor to Dutch Auction System (DAS) in October, 1999. IFEM was aimed at, among others, deepening inter-bank foreign exchange market as well as having a stable naira exchange rate. Developments in IFEM namely, persistent high demand for forex, continued depreciation of the naira with premium between official rate and those in the parallel market widening from N7.0470/$1 in 1999 to N16.3808/US$ in 2002, and continued depletion of reserves position led to its abandonment and the re-introduction of DAS in July 2002. Having previously been introduced in 1987 and 1990-91, DAS was re-introduced to address the failures of IFEM. Specifically, it was geared towards achieving the following: determination of exchange rate of naira; conserve external reserve position; reduce the premium between official rate and the parallel market; and ensure stability of the naira exchange rate.Having operated DAS for about three and half years, the CBN in 2005 introduced the Wholesale Dutch Auction System (WDAS) which has since being in operation.

3. Exchange Rate Exposure: Empirical Review

Economic theory postulates that under a floating exchange rate regime, changing exchange rates affect the competitiveness of firms, especially those engaged in international trade. Home currency depreciation promotes the competitiveness of firms in home country by allowing them to undercut prices charged for goods manufactured abroad (Luehrman, 1991). On the other hand, exchange rate appreciation reduces the competitiveness of export markets; it has a negative effect on the domestic stock market. Conversely, if the country is import denominated,

exchange rate appreciation may have positive affect on the stock market by lowering input costs. Thus, an increase in the value of the home country firm in response to a real drops in the value of the home currency.

A considerable number of studies aimed at testing the foregoing postulates have been conducted to determine the exposure of firms to exchange rate movements. Not only that these studies have been inconclusive on the nature of exchange rate exposure, they have been largely conducted on industrialized economies. In what follows, we undertake a review of the extant literature on exchange rate exposure.

Jorion (1991) empirical investigation of the sensitivity of the stock prices of US multinationals to changes in dollar exchange rates is seminal in empirical investigation of exchange rate exposure. His empirical results indicated that the sensitivity of stock prices to changes in exchange rate is not significant at any accepted level of significance.

Luetherman (1991) tested the hypothesis that an exogenous real home currency depreciation enhance the competitiveness of home country manufacturers vis a vis foreign competitor. His finding did not support that hypothesis. Firms did not benefit from a depreciation of the home country. On the contrary a significant decline in their market share of industry was found in a depreciation of the home currency.

Bodnar and Gentry (1993) examined the relationship between exchange rate changes and industry portfolio returns for Canada, Japan and the United States between 1979 and 1988. The study revealed that less than half of the industries display significant exchange rate exposure at the 10% significant level in these countries.

AlDiab, Zoubi, and Thornton (1994) examine the impact of changes in the dollar exchange rate on daily security returns of US multinational companies. The study made use of an event study methodology for the period 1978 to 1987, and concluded that the stock prices of Multinational Companies are not greatly affected by changes in exchange rates or that the relationship is weak.

Donnelly and Sheehy (1996) examine the relationship between changes in trade-weighted nominal exchange rate and the monthly abnormal returns of portfolio of the UK's 39 largest exporting firms during the period 1978 to 1992. The study finds a contemporaneous negative relationship between the foreign exchange changes and the abnormal returns of UK exporters.

Fang and Loo (1994) investigate the effect of unanticipated changes in the US trade-weighted exchange rate on US industries' common stock returns over the period 1981 to 1990. The study recorded significant negative betas for the mining, food and beverage, chemical, petroleum and utilities industries, whereas, positive exchange rate risks betas are observed in retail and apparel, machinery, transportation equipment, department stores, and miscellaneous industries.

Glaum, Brunner and Himmet (2000) examined the economic exposure of German corporations to change in DM/US dolar exchange rate. They found that German firms are significantly exposed to changes in DM/US dollar rate.

Krishnamoorthy (2001) examines whether the industrial structure is an important determinant of the exchange rate exposure of US industry portfolio returns over 1995 –1997 period. The study indicated that industries that are classified as being globally competitive and those that serve   the consumer sector of the economy have significant levels of exposure.

Chang (2002) used the two-factor model of Jorion (1990) to examine industry-level currency risk of Taiwan's stock market around the Asian financial crisis. Conclusions from the study indicated that export-oriented industries are positively affected by the depreciation of the Taiwan dollar against the US Dollar. The results further show that there is a negative relationship between firm size and currency exposure in Taiwan's stock market, thus finds support for the hypothesis that the exchange rate risk is less for larger firms than for smaller firms as documented by studies such as Nance, Smith and Smithson (1993) and   Chow, Lee and Solt (1997).

Joseph (2002) examined the impact of foreign exchange rate changes and interest rate changes on UK firms during the period 1988 to 2000. He considers two different measures of foreign exchange rate impacts, along with a measure of interest rate changes. The findings show that industry returns are more negatively affected by interest rate changes than by foreign exchange rate changes.

The only study, to our knowledge that explains the exchange rate exposure of firms from an African perspective is that of Zubeiru, Kofi and Adjasi (2007) for the Ghanaian firms. The examined the foreign exchange exposure of listed companies on the Ghana Stock Exchange over the period January 1999 to December 2004. The research uses different exchange rate measures namely; the cedi to US dollar, the cedi to UK pound sterling, the cedi to the euro and a trade-weighted exchange rate index to determine the degree of exposure. The Jorion (1990) two-factor model which regresses the return on a firm against changes in the exchange rate and return on the market was used to estimate the exchange rate exposure for the sample of twenty firms used in the study. About 55 per cent of firms in

the sample have a statistically significant exposure to the US dollar whilst 35 per cent are statistically exposed to the UK pound sterling. Sector specific exposure results show that the manufacturing and retail sectors are significantly exposed to the US dollar exchange rate risk. The financial sector did not show any risk exposure to any of the international currencies. The most dominant source of exchange rate risk exposure is the US dollar. Most firms are also negatively exposed to the cedi to US dollar exchange rate changes, implying that the cedi depreciation vis-a-vis the US dollar adversely affects firm returns.

4. Model, Data and Estimation Techniques

Following earlier studies exchange rate exposure is calculated as the sensitivity of firm returns to exchange rate movements. In order to measure Nigerian firms' economic exposure we followed Adler & Simon (1986) model. We measure economic exposure as the slope coefficient from a regression of stock returns on exchange rates.

$$R_{it} = \alpha_i + \beta_i EX_{it} + e_{it} \tag{1}$$

α_i = constant term

R_{it} = Stock return for firm i.

EX_t = Percentage change in exchange rate

The coefficient β_i represents the sensitivity of a company i's stock returns to exchange rate movements. In the model, EX represents alternative exchange rates movements. The study considered Nigerian firms exposure to the movements in the Naira to the US dollar, the Naira to the UK pound and the Naira to the euro. Positive value of β_i means that a depreciation of Naira corresponds to an increase in the value of firm, while negative value represents an adverse exposure to exchange rates movements.

Jorion (1991) introduced another macroeconomic variable market return to control for market movements. To control for the 'common macroeconomic' influences on total exposure elasticities; most emprical studies include the return to a market portfolio with the exchange rate variable in their emprical models (Bodnar & Wong, 2000).

$$R_{it} = \alpha_i + \beta_{1i} EX_t + \beta_{2i} R_{mt} + e_{it} \tag{2}$$

α_i = constant term

R_{it} = Stock return for firm i.

e_t = Percentage change in exchange rate

R_{mt} = Market return

Ordinary least squares regression will used to estimate models. Exchange rate movements can be measured in nominal or real terms. Real movements are defined as nominal movements adjusted for price level changes. Since real and nominal exchange rates are highly correlated both or one of them are used in most existing studies. The exchange rate used in the study is real effective exchange rate. The market index we employ is nominal interest rate, although we note the presence of high inflation in Nigeria economy. Finally, stock returns were proxied by earning per shares reported in the annual financial summaries of sampled firms.

This study employed secondary data sourced from the Annual reports and Accounts of the sampled firms and FACT BOOK, the annual publications of the Nigerian Stock Exchange. Exchange rates series were sourced from Statistical Bulletin of the Central Bank of Nigeria. Only quoted companies were included in the study because financial information of unquoted companies are not readily available. There are 204 quoted companies listed in the 2008 Nigerian Stock Exchange (NSE) Fact Book. The sample were purposively selected to exclude those with missing data and newly quoted companies, the selection criteria yielded a total of 117 firms, made up of 52 firms in the financial and securities sector companies and 65 firms in the Non financial sector. This sectoral segregation enabled an investigation of possible differentials in exposure by financial and non-financial firms; this becomes necessary, as financial firms possess the reputation for effectively hedging exchange rate risks. This research covers a period of 10 years from 1998 –2007. The sample period and sample size selected seem adequate and comprehensive enough for the kind of analysis intended in this study.

5. Empirical Results

In what follows, the results of the Nigerian Companies exchange rates sensitivity are reported. The model in equation 2 was estimated by Ordinary least squares regression method. First we regressed real effective exchange rate change of the three foreign currencies respectively on all sample value. Then sample was divided into two groups as financial and non-financial firms and exchange rate sensitivity of each group was examined. Table 1 to Table 3 below respectively presents summary statistics of sampled firms sensitivity to movements of the Nigerian Naira to the US dollar, the Naira to the UK pound and the Naira to the euro.

Table 1 above presents estimates of exchange rate sensitivity of Nigerian listed firms to movements in Naira/US dollar real effective exchange rates. Column 2 of the table presents results for all sampled firms, while column 3 and 4 respectively indicated results for the sub-sample divisions into financial and non-financial firms. Exchange rate exposure coefficient for all firms range between -0.012 and 0.644 with mean value of 0.222. As indicated in the table a total of 103 of total 117 sampled firms indicated a statistically significant dollar exchange rate exposure, representing 88% of total sampled firms.   Further, 23 (22.3%) were positively exposed while 80 (77.7%) were adversely exposed to the dollar.

For the financial sector firms, exposure coefficient ranged between -0.316 and 0.827 with mean value 0.221. 41 (78.8%) of 52 financial firms were statistically sensitive to dollar exchange rates movements. 19 firms were positively exposed while the remaining 22 were adversely exposed. The non-financial firms indicated a mean exchange rate exposure coefficient of 0.332. 62 (95.3%) of the 65 sampled non-financial firms were significantly exposed to US dollar exchange rates. Out of these 24 (38.7%) were favorably exposed while 38 (61.3%) were adversely exposed to the dollar exchange rates.

The summary of results presented above indicated that majority of Nigerian listed firms' returns are sensitive to dollar exchange rates with the largest proportion being adversely exposed. The results failed to indicate any significant differences in pattern of exposure between the financial and non-financial firms, thus providing no evidence to support the thesis that financial firms possess requisites to hedge exchange rates risks. However, non-financial firms has a higher value of mean exposure coefficient compared to financial sector firms.

Table 2 and Table 3 respectively present results of Nigerian firms sensitivity to changes in UK pounds and the Euro real effective exchange rates. Similar to the results presented above, Nigerian listed firms are generally exposed to risks of exchange rates movements. 88 (75.2%) of total sampled firms were significantly exposed to risks of UK pounds exchange rates movements, while 63 (53.8%) were significantly exposed to the Euro. In general terms, larger proportion of exposure incidence were adverse exposure, indicating that exchange rates instability are significant hindrance to corporate performance in Nigerian listed firms.

Overall the regression equations have good statistical fit with the t values significant for most variables. The adjusted R^2 and R were sufficiently high indicating that the independent variables explained sufficient quantity of the variations in the dependent variables. Durbin Watson Statistic (DW) also reveals the absence of serious auto correlation for all the equations. These test results shows the reliability of our estimated equations in modeling the problem under investigation.

6. Summaries and Conclusion

The study investigated foreign exchange rate risk exposure of 117 samples of Nigerian Listed firms for the period 1996 - 2005. The Jorian (1991) approach of measuring economic exposure as a slope coefficient of the regression of stock returns on exchange rates movements was used.

The study utilized three alternative currencies exchange rates, viz; the US Dollar, the UK Pounds and the Euro effective real exchange rates. Findings reveal that Nigerian listed firms are generally exposed to adverse exchange rates risks of the three currencies under investigation, with a higher magnitude of exposure to the US dollar.

The study further investigated differences in exposure by financial and non-financial sector firms. The results failed to indicate any significant differences in pattern of exposure between the financial and non-financial firms, thus providing no evidence to support the thesis that financial firms possess requisites to hedge exchange rates risks.

The study concluded that exchange rates instability are significant hindrance to corporate performance in Nigerian listed firms. For policy, monetary and exchange rates management should emphasize achieving sustainable stability in exchange rates movements.

References

Adler, M. and B. Dumas. (1984). Exposure to Currency Risk: Definition and Measurement, *Financial Management,* 41 - 50.

Adler, M. and Simon, D. (1986). Exchange risk surprises in international portfolios. *Journal of Portfolio Management,* Vol 12 No 2, pp. 44-53.

AlDiab, T.F., M.M, Zoubi, and P.W. Thornton. (1994). The effect of changes in the dollar foreign exchange rate on stock returns of multinational corporations. *Journal of Applied Business Research,* Vol.10.

Allayannis, G. (1997). The Time-Variation of the Exchange-Rate Exposure: An Industry Analysis, University of Virginia working paper.

Allayannis, George and Jane Ihrig. (2002). Markups and Exposure. *Review of Financial Studies*, 14, no3, p805-835.

Bodnar, Gordon and Gentry, William. (1993). Exchange-rate exposure and industry characteristics: evidence from Canada, Japan and U.S. *Journal of International Money and Finance*, 1993,12(1), pp. 29-45.

Chang, Y. (2002). The Pricing of foreign exchange risk around the Asian Financial crisis: Evidence from Taiwan's stock market, *Journal of Multinational Financial Management*. Vol.12.

Chow, E. H., Lee, W. Y. and Solt, M. E. (1997). The exchange-rate risk exposure of asset Returns. *Journal of Business* 70, 105-123.

Dominguez, Kathryn and Tesar, Linda. (2000).Exchange Rate Exposure. Mimeo, University of Michigan.

Donnelly, R., and E. Sheehy. (1996). The share price reaction of U.K exporters to exchange rates movements: An Empirical study. *The Journal of International Business Studies*, Vol.27.

Fang, H and J.C. Loo. (1994). Dollar value and stock returns. *International Review of Economics and Finance,* Vol.3.

Brunner, M., Glaum, M. and Himmel, H. (2000). The DAX and the Dollar: the economic exchange rate exposure of German corporations. *Journal of International Business Studies*, Vol 31, No 4, pp. 715-724.

Griffin, J.J and R. Stulz. (2001). International competition and exchange rate shocks: A cross-country industry analysis of stock returns, *Review of Financial Studies*, vol 14.

Jorion, P. (1990). The Exchange rate exposure of U.S. multinational. *Journal of Business*, Vol. 63 No: 3, 331-345.

Jorion, P. (1991). The Pricing of Exchange Rate Risk in Stock Market, *Journal of Financial and Quantitative Analysis*, September, 363-376.

Joseph, N.L. (2002). Modelling the impacts of interest rate and exchange rate changes on UK stock returns. *Derivatives Use, Trading and Regulation,* Vol. 7.

Krishnamoorthy, A. (2001). "The impact of industrial structure and the exchange rate exposure of industry portfolio returns" *Global Finance Journal*, Vol.12.

Luehrman, T. A. (1991). Exchange Rate Changes and the Distribution of Industry Value. *Journal of International Business Studies*, 22, 619-649.

Nance, D., C. Smith & C. Smithson. (1993). On the determinants of corporate hedging. *Journal of Finance,* Vol.48.

Zubeiru, Kofi & Adjasi. (2007). Foreign exchange risk exposure of listed companies in Ghana. *The Journal of Risk Finance Incorporating Balance Sheet*, Volume 8, Number 4.

Table 1. Foreign Exchange Rate Exposure of Nigerian Firms to the US Dollar

		All Firms	Financial Firms	Non-Financial Firms
Sample Size		117	52	65
Exposure Coefficient (β_i): Mean		0.222	0.221	0.332
	Minimum	-0.012	-0.316	-0.233
	Maximum	0.644	0.827	0.772
Significant Exposure:				
	Number of Firms	103	41	62
	Percentage of Total	88%	78.8%	95.3%
Sign of Exposure Coefficient (β_i):				
	Positive	23 (22.3%)	19 (46.3%)	24 (38.7%)
	Negative	80 (77.7%)	22 (53.7%)	38 (61.3%)

Source: Author's computations from OLS regression analyses.

Table 2. Foreign Exchange Rate Exposure of Nigerian Firms to the UK Pound

	All Firms	Financial Firms	Non-Financial Firms
Sample Size	117	52	65
Exposure Coefficient (β_i): Mean	0.321	0.432	0.115
Minimum	-0.188	-0.211	-0.413
Maximum	0.812	0.734	0.791
Significant Exposure:			
Number of Firms	88	32	56
Percentage of Total	75.2%	61.5%	86.1%
Sign of Exposure Coefficient (β_i):			
Positive	23 (26.1%)	19 (59.4%)	24 (42.8%)
Negative	65 (73.9%)	13 (40.6%)	32 (57.2%)

Source: Author's computations from OLS regression analyses.

Table 3. Foreign Exchange Rate Exposure of Nigerian Firms to the Euro

	All Firms	Financial Firms	Non-Financial Firms
Sample Size	117	52	65
Exposure Coefficient (β_i): Mean	0.255	0.127	0.221
Minimum	-0.321	-0.251	-0.254
Maximum	0.822	0.776	0.654
Significant Exposure:			
Number of Firms	63	29	34
Percentage of Total	53.8%	55.7%	52.3%
Sign of Exposure Coefficient (β_i):			
Positive	23 (36.5%)	19 (65.5%)	14 (41.2%)
Negative	40 (63.5%)	10 (34.5%)	20 (58.8%)

Source: Author's computations from OLS regression analyses.

How Asian and Global Economic Crises Prevail in Chinese IPO and Stock Market Efficiency

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Abstract

By considering two time windows of crises, first one is the time period of Asian financial crisis (1997-1999) and the other one is prevailing global economic crisis (2007-2009), the pattern of underpricing and aftermarket performance are studied. A sample of 626 companies and Market adjusted return model are used. Result indicates that in the recent global economic crisis IPO activity is on shrinking trend and there is 10% increase in average underpricing as compared to last Asian financial crisis. There is a fluctuating trend in aftermarket performance of IPO returns. A minimum return of 62% in 2009 is observed. This study also endeavors to examine the efficiency of Chinese stock market and how the Asian and global financial crisis influences the efficiency of Chinese stock market. In order to determine the efficiency of Chinese stock market we apply efficient market hypothesis of random walk. Here we apply ADF, DF-GLS, PP and KPSS tests on stock market returns in order to check the unit root in data series for both Shenzhen and Shanghai stock exchanges separately. The results of the study shows that Chinese stock market is weak form efficient and past data of stock market movements may not be very useable in order to make excess returns. In both periods of crises Chinese stock market is observed weak form efficient.

Keywords: Asian financial crisis, Global financial crisis, IPO, Stock market efficiency

1. Introduction

The Asian financial crisis was a period of financial crisis that gripped much of Asia beginning in July 1997, and raised fears of a worldwide economic meltdown due to financial contagion. The crisis started in Thailand with the financial collapse of the Thai baht caused by the decision of the Thai government to float the baht. Indonesia, South Korea and Thailand were the countries, most affected by the crisis. Hong Kong, Malaysia, Laos and the Philippines were also hurt by the slump. The People's Republic of China, India, Taiwan, Singapore, Brunei and Vietnam were less affected, although all suffered from a loss of demand and confidence throughout the region.

One the other hand global economic crisis of 2007–2010 has been called by leading economists the worst financial crisis since the Great Depression of the 1930s. Economists have now started calling it "The Great Recession." It contributed to the failure of key businesses, decline in consumer wealth estimated in the trillions of U.S. dollars, and a significant decline in economic activity. Many causes have been proposed, with varying weight assigned by experts. Both market-based and regulatory solutions have been implemented or are under consideration, while significant risks remain for the world economy over the 2010-2011 periods. Strong early economic growth, no debt crisis and stable Yuan are the key features due to which china was among the least effected countries in this crisis.

Although the literature on financial crisis setback is very extensive but one dimension that has not taken much attention is the massive falling of stock prices and generation of investments through IPOs in several Asian countries including China, in both crisis especially in recent prevailing global economic crisis. This issue was firstly raised by Kim and Shamsuddin (2006), Cheong et al. (2007) and Hoque et al.,

Now we will come to second part of our study, which is about stock market efficiency. The term market efficiency is broadly used in capital markets to explain the degree to which the present asset price or stock price reflects all available information in the market place and thus relying upon this information one can buy or sell the stocks which should, on average return investors only a fair measure of return after deducting transaction costs for the associated risk. Samuelson (1965) provides the concept of efficient market hypothesis (EMH) according to which the price of an asset fluctuate randomly and further this concept is revised by Fama (1970,1991) in which he evidenced for market efficiency on the basis of development in research. For making investment policies both in emerging and developed markets, the concept of market efficiency has important implications. Different investment strategies could be adopted after deciding whether the market is efficient or inefficient. For example, in an efficient market the best strategy to make optimal profit is to concentrate on risk and return feature of an asset or portfolio, because when the market is efficient the price of an asset reflect the market, so the best way to estimate the risk and expected return of the asset, taking into account what is known about the asset at that time. Therefore, in such case there will be no undervalued assets offering higher than expected return or overvalued assets offering lower than the expected return. In contrast, if the market is not efficient the best way to make investment is to spot winners and losers in the market and correct identification of miss-priced assets could help to enhance or optimize the performance of overall investment (Rutterford; 1993). The factor of globalization and rapid growth in technology innovation enhance integration of financial markets world over, so the understanding of market efficiency even in emerging markets is becoming more important as a consequence of integration with more developed markets and free movement of investments across national boundaries. In developing countries like China, the contribution of equity markets in the process of development is less as compare to developed markets and the equity markets of western developed world considered more efficient than developing nations. Due to factor of integration and reform process to open economies in emerging markets provide chances of getting heavy capital inflows from developed markets to developing markets and make this possible for investor to diversify their investments and risks across boundaries.

China is one of the fastest growing emerging economies in the world and rapidly growing from last 30 years since its opening in 1979. The two stock exchanges in Shanghai and Shenzhen were established in early 1990s and different reform process were initiated as a result demand for investment funds still growing significantly and capital market growth expected to play an increasingly important role in the process of development. At this transitional stage to development, it is very important to access the level of efficiency of the Chinese equity market in order to establish its long-term role in the process of economic development. The purpose of this study is to test whether Chinese stock market is weak form efficient or not in normal circumstances and what impact global financial crisis has on the efficiency of Chinese stock market. Under Efficient Market Hypothesis (EMH) to predict future expected prices or returns, we could use past actual prices or returns. The behavior of share price changes could tested for serial independence and random walk theory for equities prices show an equities market in which new information is quickly discounted into prices and abnormal or excess returns cannot be made from observing past prices.

In order to identify principle process and behavior of market return generation the pattern of short-term movements of combined market return is the key through which we could measure the historical market efficiency. The concept of market efficiency based on the theory of random walk process through which we determine underlying market is efficient or inefficient. If the market is efficient then it follows a random walk process and model will fail to identify any pattern, in such case historical data cannot be useful to determine expected returns. On other hand if market is not efficient then it means market is not following a random walk process and the model used will identify the pattern of market movement, in this case data series is considered to be stationary and historical data can be useful to identify future returns. Here from above discussion it is clear that identification of pattern in time series data is the main key to determine that market is efficient or inefficient. Eugene Fama (1970) identified three levels of market efficiency:

Weak-form efficiency: The market said to be weak-form efficient when prices of the securities instantly and fully reflect all information of the past prices, so the future price movements cannot be predicted by using past prices.

Semi-strong efficiency: In such case, the prices of securities or assets fully reflect all the publicly available information. Therefore, only investors with additional inside information could have advantage in the market.

Strong-form efficiency: In this category, the prices of securities fully reflect all the publicly available information along with private information (inside information). Therefore, in such a case, no one can have advantage in predicting returns in the market, because there is no data that would provide additional value to the investors.

The purpose of this study is to examine the degree of under pricing and after market performance in new issues of Chinese stock market during last Asian financial crisis and prevailing global financial crisis because in such kind of circumstances the volatility of market is sometimes unpredictable for both emerging firm and its stakeholders.

2. Literature Survey

Ritter (1984) argue that the Underpricing or high IPO return is a phenomenon common to most stock markets, regardless of whether these markets are in developed or emerging economies. Under pricing seems to be contradicted for market efficiency and may hurt emerging firms trying to raise capital for expansion. Under pricing also depends upon the time period a firm decides to go public. Ritter and Welch (2002) point out, that there is no single dominant theoretical cause for under-pricing. Hence, there is no universal IPO underpricing theory or hypothesis applicable for all times and across countries. A large positive gain of a new issue immediately after market relative to its offering price is a recurring phenomenon in many markets, has been noted as one of the 10 puzzles in financial research Brealey and Myers (2002). Underpricing have been put forward and tested against the data of various stock markets. Ibbotson et al., (1988) found that the average first-day IPO return was 16.3 percent in the years 1960–1987 in the US market. Levis (1990) studied a sample of 123 offers for sale on the London Stock Exchange for the period 1985–1988 and found that on average the market-adjusted discount was 8.6 percent on the first day of trading. Some of the previous studies have noted that Chinese IPOs enjoy the world's highest initial returns at around 200–300 percent etc: Datar and Mao (1997), Mok and Hui (1998), Chan et al (2004). Loughran et al (1994) confirmed this IPO under pricing phenomenon in 25 countries, with higher IPO underpricing in developing than in developed markets. The extent of IPO underpricing ranges from a few percent. Muscarella and Vetsuypens (1989) studied 38 US investment bank issues for the period between 1980 and 1981 and observe 48% underpricing for 'hot' issues. However, an astounding underpricing of 149.3% has been found in the developing Malaysian market Hanley and Ritter (1992). Evidence of this IPO under pricing phenomenon also abounds in Asian stock markets such as Japan, Hong Kong and Singapore Hanley and Ritter (1992), Dawson and Kiraki (1985), Mc Guinness (1992), Wong and Chiang (1986), Saunders and Lim (1990), Dawson (1984), Korea Lim(1992). Although lot of empirical studies have been carried out and theoretical literature written to enhance people's knowledge towards these issues; yet it is arduous for people to clearly understand the various issues related to IPO especially with different types of equities in different industries and in different markets and also in different time periods. As for reasons of Chinese IPOs under pricing is concern, a long time lag, some institutional characteristics Aggrawal and Prabhala (2002), regulations and government ownership Xiao Chen et al(2008), poor accounting disclosure and auditing standards Benveniste and Spindt(1989), distribution mechanism Chowdhry and Sherman(1996) and uninformed investors Rock(1986) are the main reasons for high under pricing of new issues.

As far efficiency of stock market is concern the essence of this theory was taken from the concept of random walk theory. Bachelier in 1900 introduces the idea that asset prices may follow a random walk pattern. The future path of the price level of a security is no more predictable than the path of a series of accumulated random numbers or in statistical terms successive price changes are independent and identically distributed random variables Fama(1965). In contrast to this theory Andrew W. Lo (1988) totally reject the theory of random walk by taking the data into sample period from 1962-1985 and concluded that the past prices data cannot attribute completely to the effects of infrequent trading or time varying volatilities. In following to these earlier studies some other researchers conduct

same random walk concept hypothesis to test its implication on financial data of different countries markets which can be grouped into developed and emerging markets e.tc. Korea (Ryoo and Smith (2002) use a variance ratio test and find that the market follow random walk pattern, if the price limits are relaxed. China, (lee et al 2001) uses GRAPH and EGRAPH models and found that the volatility is highly persistent and predictable. Hong Kong (Cheung and Coutts 2001) by using variance ratio test found that the index on Hong Kong stock market follow a random walk. Spain (Regulez and Zarraga, 2002), Africa (Smith et al. 2002; Appiah-kusi and Menyah, 2003), and Middle East (Abraham et al. 2002) they all use variance ratio tests and runs test on the financial data of different countries for testing random walk hypothesis and found week form efficient these markets are and follow a random walk. The concept of efficient market hypothesis was firstly introduced by Samuelson (1965), that properly anticipated price of an asset fluctuate randomly. Fama (1970) presented a formal review of theory and evidence for market efficiency. To prove the theory in his empirical work he divided security prices into three information subsets first one was" week form   test", second is " semi strong form test" and third one was " strong form test". He characterized an efficient capital market in which security prices fully reflect all available information and further revised his theory on the basis of development research   in 1991.In his revised work he hypothesize on information and trading costs, the costs of getting prices to reflect information (Fama 1991). Upon the connection information and market efficiency Bernard and Thomas (1990) present a robust testing model in which they conclude that prices may partially reflect the information regarding future earnings, but not reflect all available information by focusing on abnormal returns at the time of earnings announcements, and also argue that these can be predicted from the unexploited information in past earnings. They also demonstrate that the signs of average abnormal returns at quarterly earnings announcement dates agree with those predicted by a model that exploits the (+,+,+,-) signs of the serial correlation. Burton G. Malkiel (2003) examines the attacks on the efficient market hypothesis and believe that the stock prices are partially predictable by focusing on statistical findings of relationship between predictability and efficiency, crash of 1987 and internet bubble, he conclude that our stock markets are far more efficient and far less predictable. In his point of view an efficient market do not allow investors to earn above average returns without accepting above average risks and sports the view that stock market has no memory and the way past prices changed cannot be use in divining how it will behave in future, same survey and empirical results were concluded in the study of cootner (1964). Balvers et al., (1990) argue on predictability of returns, intertemporal asset pricing, and macroeconomic fluctuations by using a simple equilibrium model with relation to consumption opportunities and output. Consumption opportunities vary along with variations in aggregate output investors are forced with a less smooth consumption pattern. Investors adjust their required rate of return on stock in order to smooth consumption. This linkage provides a base in which returns could be predictable up to an extant related to the predictability of aggregate output. The change in utility consumptions further result in utility-increasing intertemporal transactions, so under this scenario we could say that predictability is consistent with efficient markets. Rendleman, Jones and Latané (1987) hypothesize that the investors are not fully aware about the serial correlation in earnings which prevail among quarterly earnings changes, so they do not use this information to enhance their earnings.

Efficient market hypothesis has a twofold functions firstly it could be use as a theoretical and predictive model for operations in a financial market and secondly it could be use as a technique in impression management campaign to attract more peoples for investment in stock market (Will 2006). Traditionally more developed western equity market is considered to be more efficient and the contribution of equity markets in the process of development in developing countries is less due to restrictions and controls which resulted in a weak markets (Gupta, 2006).

Along with empirical literature on efficient market hypothesis, many other researchers try to explain it through behavioral perspective. Robert J. Shiller (2001) tries to explain efficient market hypothesis through behavioral principles. According to Shiller behavioral principles are derived from psychology, sociology and anthropology. In his work, he discussed some behavioral principles, which are relevant in context of efficient market hypothesis. The principles discussed are prospect theory, regret and cognitive dissonance, anchoring, mental compartments, overconfidence, over- and underreaction, representativeness heuristic, the disjunction effect, gambling behavior and speculation, perceived irrelevance of history, magical thinking, quasi-magical thinking, attention anomalies, the availability heuristic, culture and social contagion, and global culture. Joseph E. Finnerty (1974) on the topic of insider's access to information and market efficiency conclude that market is not strong-form efficient and insiders are able to outperform the market because they can identify profitable as well as unprofitable situations within their corporations.

3. Data and Methodology

The data used in this study in order to measure the performance of IPOs market is comprises of 626 companies, which issue and list their shares on either Shanghai or Shenzhen stock exchanges during the period of January 1,

1997 to December 31, 1999 and January 1, 2007 to December 31, 2009. The primary source of data for daily prices and IPO is CCER, (Chinese Center for Economic Research) database.

Table 1 reports that, total of 626 companies are considered out of which 210 companies listed their share on shanghai stock exchange and 416 companies listed on Shenzhen stock exchange. IPO activity is on peak in 1997 with a record of 188 IPO brought into the market and then went down sharply in 1998 up to 95 after that a slight increase up to 97 IPO in 1999. In second sample period of time 126 IPO are brought into market in 2007, which is the starting year of global economic   crisis and then came down to 77 in 2008 and further came down to only 43 IPO in 2009. It can be seen form Table 1 the IPO activity is increasing with the passage of time on Shenzhen stock exchange as compared to shanghai stock exchange.

The stock market adjusted first day returns $(MAR_{i,1st})$ Carter et al., (1998) is used in the following research as the proxy for underpricing of IPO in the first trading day.

$MAR_{i,1st}$ is computed as following:

First day stock return $FR_{i,1st}$

$$FR_{i,1st} = (P_{i,1st}/P_{i,o}) - 1 \tag{1}$$

Where $P_{i,1st}$ is the price of stock i on the first trading day and $P_{i,o}$ is the offer price of stock i.

First day stock market return $(SMR_{m,1st})$

$$SMR_{m,1st} = (P_{m,1st}/P_{m,o}) - 1 \tag{2}$$

Where $P_{m,1st}$ is its corresponding SHSE or SZSE overall composite indexes on the first trading day and $P_{m,o}$ is SHSE or SZSE overall composite indexes on the offering day. Stock market adjusted first day return $(MAR_{i,1st})$

$$MAR_{i,1st} = FR_{i,1st} - SMR_{m,1st} \tag{3}$$

Stock market return (SMR) is the change in the first listing date of an IPO compared with that on offering date, on the corresponding stock exchange overall composite index. It indicates market sentiment of the total stock market in the duration period. So MAR_{1st} can value underpricing more accurately because it extracts the impact of the overall stock market on an individual IPO's under-pricing.

For the sack of measuring stock market efficiency number of techniques can be used to identify pattern in a series of data and all have their own merits and demerits. In order to measure the stock market efficiency, this study will use the stock market return of Shanghai and Shenzhen stock exchanges. Different methods have been used in past studies to measure the stock market efficiency. Etc: Runs Test (Bradley 1968), LOMAC variance ratio test (Lo and MacKinlay 1988), Durbin-Watson test (1951). After going through the merits and demerits of above mentioned tests we decided to apply Augmented dickey fuller (1979) test in order to check unit root in data series. Most of the new studies are using this test due to its more reliability in measuring unit root. This test do not follows the conventional t-distribution. This test can be used to derive asymptotic results and could simulate critical values for various tests and sample sizes. This test has multiple choices for its use. It can be used with a constant, a linear time trend and with regression.   For our study we will use the regression model in its standard form, with drift and with drift and trend for testing unit root.

$$SPI_t = \alpha SPI_{t-1} + \varepsilon_t \tag{4}$$

$$SPI_t = u^* + \alpha SPI_{t-1} + \varepsilon_t^* \tag{5}$$

$$SPI_t = u^{**} + \beta(t-T) + \alpha^{**} SPI_{t-1}\varepsilon_t^{**} \tag{6}$$

The denomination of these equations is as follows. Equation (4) is for standard model, (5) is for standard model with drift, (6) for standard model with drift and trend. SPI_t is the logarithm of stock price index at time t. u^* and u^{**} are drift parameters. "T" is the total number of observations. $\varepsilon, \varepsilon^*, \varepsilon^{**}$, are error terms that could be

autoregressive moving average process with time dependent variance. "U" is an arbitrary drift parameter, while α is the change in index and ε_t is a random disturbance term.

For checking the non-stationarity of the data the Augmented Dickey-Fuller unit root will be applied in the form of following regression equation in order to check the null hypothesis.

$$y_t = \theta y_{t-1} + u_t \tag{7}$$

If the series will be stationary then $\theta = 1$, and against this, if model detect non-stationarity in data series then $\theta <$ 1. Therefore, the hypotheses of our study are

H_0 : Time series is stationary.

H_1 : Time series is non-stationary.

The null hypothesis of the study will be rejected if the statistical value is lesser than the critical value and data series will be considered as non-stationary (following the random walk). In this study, we will calculate daily market return by applying a formula(8) on daily stock market indices for both Shanghai and Shenzhen stock exchanges.

$$R_t = Log\left(\frac{I_t}{I_{t-1}}\right) \tag{8}$$

The sample data for testing efficiency is also collected from CCER (Chinese centre for economic research) database. Saturday and Sunday are the weekend days in china, so both stock exchanges remain close on these days. According to basic time series requirement, the observations should be taken at a regular space interval. The requirement however, is that the frequency be spaced in terms of the processes underlying the series. The underlying process of the series in this case is trading of stocks and generation of stock exchange index based on the stock trading, as such for this study the index values at the end of each business day is appropriate (French, 1980).

For robust testing we use DF-GLS, PP and KPSS tests. The data characteristics are mentioned in Table 2 (a) and 2 (b). In order to check the stationarity of data series, study uses Augmented Dicky Fuller (ADF) Test in its standard form with drift and with drift and trend for both periods of time separately.

4. Results and Findings

The cumulative market adjusted returns for 5th, 10th, 20th, 30th, day of trading are computed in order to look at the short run under pricing of newly issued stocks and for the sake of further evaluation of under pricing and sustainability of prices the time window of 50th, 100th, 200th, and 300th, day is taken. Along with their corresponding Median, t-value and standard deviation are also computed. A brief summary of results is given in Table 3.1, 3.2 and Table 4 for all 626 IPO either issued on Shanghai or Shenzhen stock exchanges.

Table 3 (a and b) shows that the first day market adjusted returns are highly significant at 1 percent, i.e. for Asian financial crisis (1997-1999) 135.73% , while for the second and recent global economic crisis (2007-2009) is 145.20%, which on average, shows a 10% increase in the level of under pricing of newly issued stocks as compared to last crisis. The IPO activity also shrinks to 246 IPOs in the recent crisis (380 IPOs in 1997-1999), which may due to the high volatility of initial returns and instability of prices in the long run.

In 1997, 188 new IPO were placed into the market which is the peak point of new issues ever in Chinese stock exchanges and their first day market adjusted returns were 158.89%, on the other hand in 2007 the beginning of the global crisis, the IPO activity shrinks to 126 IPO in the whole year with the first day market adjusted initial returns of 189.32%, which represents an inverse relationship, a decrease in number of IPO and increase in the level of under pricing up to 30.43%. However, in the second year of both crisis (1998 and 2008) the number of new issues were 95 and 77 respectively, which is a huge decline as compared to the first years of both crises (188 in 1997 and 126 in 2007). The degree of under pricing is 132.97% and 119.44% in 1998 and 2008 respectively. It indicates that the degree of underpricing also decreases along with the number of IPO. In third year of Asian financial crisis 97 new IPO were issued which is a slight increase of IPO activity as compared to last year's 95 IPO and their degree of under pricing shrinks up to 110.89%, while in 2009 the IPO activity is at its minimum level. Only 43 IPO were issued and they were under-priced up to 62%, which is the lowest level of underpricing as compared to the average level of underpricing usually in Chinese stock market.

As far short run performance is concerned, table 4 shows that there is a decreasing trend in market adjusted returns on average up to 50th day in first financial crisis .The average initial abnormal returns from the 1st trading day to the 5th, 10th , 20th ,30th and 50th trading days slightly decrease from 135.73percent to 135.04, 133.95, 133.15,

133.02and 132.57 percent respectively, and then regain their returns and there is upward trend form day 100th ,200th and 300th with some slight increase of 133.84, 136.82 and 140.32 percent. As indicated in Table 3.

In second period of global economic crisis the performance of stock is not too different from first period of crisis. The average initial returns decreases sharply from 1st, 5th, 10th, 20th, and 30th day of trading from the level of 145.20 percent to 140.70, 139.57, 139.57, 137.09 respectively, and then a surprising gain up to 50th day of 151.17 which is more than its first day initial returns but again there is downward trend on 100th, 200th, and 300th trading days, i.e.0 148.34, 147.96 and 145.20 percent respectively.

In comparison of other studies on Chinese IPO market, the initial returns are 200-300 percent Datar and Mao (1997), Gu (2000). The returns obtained here are much lower. There are some reasons for this. First the earlier researches are carried out mostly before 1996. On that period of time Chinese IPO market was very immature and volatile, the supply of new issues was also very limited as compare to huge demand, and the initial returns were tremendously high. Liu and Li (2000) documented that the first day's initial and abnormal returns of IPOs in China were much higher in 1991, 1992 and 1993 than those in other years. In addition, with less experience in pricing IPO in the early years, the CSRC tended to underpriced to a greater degree in order to encourage the growth of the primary market secondly, due to the shortage of data, some researchers calculate the initial returns without considering the growth of the whole market, while in our study the initial returns are market-adjusted, unadjusted initial returns that do not consider market impact would be higher than real returns, while only market adjusted returns can give us accurate pictures of the degree of underpricing in the Chinese IPO market.

4.1 Efficiency test during Asian financial crisis (1997-1999)

The statistical value of ADF test in Shenzhen stock exchange is -5.900187 which is lesser than its corresponding critical values (-3.632900, -2.948404, -2.612874) at 1%, 5%, and 10% level of significance respectively. So here we will reject our null hypothesis and accept alternative hypothesis. The series is considered as non stationary and having the unit root. In robust testing the statistical values of DF-GLS and PP tests are also lesser than their critical values and proving series has the unit root. But the case is different in KPSS test, here the statistical value is greater than its critical values at all levels of significance. So here we reject the alternative hypothesis and will accept the null, that series is stationary, which has no unit root and past stock market data could be useable for making abnormal returns. The same statistical conclusion is obtained from Shanghai stock market returns. The statistical values of all tests except KPSS are lesser than their critical values and depicting that the series is non stationary. Table below mentioned is depicting the picture of above discussion.

The results are not different when we check the regression line with intercept and trend (table-5-a and b). The statistical values for all tests are lesser than their critical values at all levels of significance except for KPSS test. Series is non stationary in ADF, ADF-GLS, and PP tests, but stationary in KPSS test statistics.

4.2 Efficiency test During global financial (2007-2009)

Table 7 (a, b) shows that during the period of Global crisis the ADF test in Shenzhen and Shanghai stock exchanges are -5.149318, and - 5.522392, which are lesser than their critical values of -3.679322, -2.967767, -2.622989 at 1%, 5%, 10% significance levels respectively. So the null hypothesis is rejected and data series are considered non-stationarity by accepting alternative hypothesis. Same results are obtained by robust testing.

The test statistics with intercept and trend for the period of crisis are also not too different. The statistical values of all ADF, DF-GLS, PP and KPSS with drift and trend are lesser than their critical values (Table 8) at all significance levels. So here again the study rejects the null hypothesis and consider that the data series on both exchanges as non-stationary.

5. Conclusion

The periods of Asian and global economic crisis are considered drastic for the world economy in which most of the world economies face loss to their paper wealth and balance of payments were disrupted. The impact of such kind of conditions on stock markets is obvious due to financial integrations of world economies. In both crises a chain reaction is observed, which start from one economic sector, then move to other sectors and finally griped the world economy as whole. China is also among the Leading emerging economies and having close integration with other economies of world. Stock markets are among the leading indicators in such kind of circumstances for depicting the picture of severity. Lot of stock market crashes were observed in both period of crises, especially in recent global economic crisis in which stock prices touch to its bottom in many developed and emerging stock markets. Chinese stock market also effected by this crisis in which stock prices continuously dropped over the period 2007 and 2008. The purpose of this study is to aces and compares the impact of Asian and Global financial crisis on Chinese IPOs and stock market efficiency.

This study focuses on the extent of IPO under pricing and their performance in the event time window of last Asian financial crisis and prevailing global economic crisis. It is interesting to note that the extent of underpricing in prevailing global economic crisis has increased up to 10% on average and in short run performance initial returns to investor fell more sharply than the period of Asian financial crisis. In the Asian Financial crisis, the trend of market adjusted returns is very smooth. On the other hand, in this crisis, the aftermarket performance has a fluctuating trend of market adjusted returns due to unexpected movements in market returns and stock prices. Only 246 IPO are issued from 2007-2009, as compared to 380 IPO from 1997-1999, and the IPO activity is also shrinking as the period of crisis goes on to its critical point. There are only 43 IPO in 2009 with initial returns of 62 percent which indicates a decreasing trend in IPO activity and shows the investors are more informed and psychologically affected by sudden movements of market which forces the new companies not to come in the market.

Analysis of Market Efficiency is an important concept for the investors who wish to hold internationally diversified portfolios. With increased movement of investments across international boundaries owing to the integration of world economies, the understanding of efficiency of the emerging markets is also gaining greater importance. The results of the study shows that Chinese stock market is weak form efficient in both period of crises and data series are non-stationary, here exist unit root in data series. It means that Chinese stock market is following the random walk process. The investors can not generate excess profits by using and observing past behavior of stock price movements. Here is no significant difference in market efficiency in both periods of crises. One good possible way to enhance the market efficiency is to introduce financial innovation in the emerging stock markets. New financial products create the opportunities for investors to mobilize their savings and very useful in breaking the relation between origination and ownership. When new financial instruments come into market, this will provide opportunities to the investors to allocate their risks in different securities and in different investor classes. This financial innovation is also very helpful in reducing the cost of capital and allocation of capital at its maximum, which will finally result in maximum utilization of sources and enhance market efficiency at its best. It is observed in major developed world markets that when new financial instruments and technological advancements come into market, it boosts the market efficiency significantly. The most common examples of these innovative advancements are the markets of Europe, USA, and Australia, where these financial innovations contribute a lot in their economic growth. Thus, financial innovations in emerging financial sector in China as whole are beneficial. The recent global financial crisis remind the world that this financial innovations are mixed blessings, not risk free and also has its shortcomings.

References

Abraham, A., Seyyed, F. J., and Alsakran, S. A. (2002). Testing the random behavior and efficiency of the Gulf stock markets, *The Financial Review*, Vol. 37, No. 3. pp. 469-480.

Aggrawal R., Prabhala N.R., Puri M. (2002). Institution allocation in initial public offerings: empirical evidence, *Journal of Finance*, Vol. 57, pp. 1421-1442.

Andrew W. Lo, A. Craig Mac Kinlay. (1988). Stock Market Prices Do Not Follow Random Walks: Evidence from a Simple Specification test, *The review of financial studies*, Vol. 3, pp. 175-205.

Appiah-Kusi, J. and Menyah, K. (2003). Return predictability in African stock markets, *Review of Financial Economics*, Vol. 12, No. 3, pp. 247-271.

Bernard, V.L. and J.K. Thomas. (1990). Evidence that stock prices do not fully reflect the implications of current earnings for future earnings, *Journal of Accounting and Economics*, Vol. 13, pp. 305-340.

Benveniste, L.M., Spindt, P.A. (1989). How investment bankers determine the offer price and allocation of new issues, *Journal of Financial Economics*, Vol., 24, pp. 343–361.

Bradley, J. V. (1968). Distribution-Free Statistical Tests, Herman H. J. Lynge and Søn A/S, New Jersey.

Brealey, R., Myers, S. (2002). *Principles of Corporate Finance*, McGraw-Hill, New York.

Ibbotson, R.G. Sindelar, J.L., Ritter, J.R. (1988). Initial public offerings, *J. Appl. Corp. Finan*, Vol. 7, pp.6-14.

Burton G. Malkiel (2003). The Efficient Market Hypothesis and Its Critics, *Journal of Economic Perspectives*, Vol 17, No. 1, pp. 59 – 82.

Carter, R., Dark, F., & Singh, A. (1998). Underwriter reputation, initial returns and long run performance of IPO stocks, *Journal of Finance*, Vol. 53, pp. 285−311

Cheung, K.C. and Coutts, J.A. (2001). A note on weak form market efficiency in security prices: Evidence from the Hong Kong stock exchange, *Applied Economics Letters*, Vol. 8, No. 6, pp. 407-410.

Chan, K., Wang, J.B., Wei, K.C. (2004). Under pricing and long-term performance of IPOs in China, *J. Corp. Finance*, Vol. 10, pp. 409–430.

Cheong, C. W., Nor, A. H. S. M., & Isa, Z. (2007). Asymmetry and long-memory volatility: Some empirical evidence using GARCH, *Physica A*, Vol. 373, pp. 651−664.

Chowdhry, B., Sherman, A.E. (1996). The winner's curse and international methods of allocating initial public offerings, *Pacific-Basin Finance Journal*, Vol., 4, pp. 15–30.

Cootner, Paul, ed. (1964). The Random Character of Stock Market Prices, Cambridge, Mass.: MIT Press.

Datar, V., Mao, D. (1997). Initial public offerings in China: why is under pricings of severe, Unpublished working paper, Seattle University.

Dawson, S.M., Kiraki, T. (1985). Selling unseasoned new shares in Hong Kong and Japan: A test of primary market efficiency and under-pricing, *Hong Kong Journal of Business Management*, Vol. 3, pp.125–134.

Dawson, S.M. (1984). Under pricing new share issues: is Singapore an immature market? *Singapore Management Review*, Vol. 6, No. 2, pp. 1–9.

Dawson Steven M. (1987). Secondary stock market performance of initial public offers: Hong Kong, Singapore and Malaysia, *Journal of Business Finance & Accounting,* Vol. 14, pp. 65-76.

Eugene F. Fama. (1965). The Behavior of Stock-Market Prices, *The Journal of Business*, Vol. 38, No. 1, pp. 34-105.

Fama, E. (1970). Efficient Capital Markets: A Review of Theory and Empirical Work, *Journal of Finance*, Vol. 25, pp. 283-306.

Fama, E. (1991). Efficient Capital Markets II. *Journal of Finance*, Vol. 46, pp. 1575-1671

Gu, Y.X. (2000). Privatization, firm size, and IPO performance: evidence from Chinese "A" share issues, Unpublished working paper, State University of New York.

Gupta, R. (2006). Emerging Markets Diversification: Are Correlations Changing Over time?. *Paper presented at international academy of business and public administration disciplines (IABPAD) Conference*, Orlando.

Hanley, K.W., Ritter, J.R. (1992). Going Public. The New Palgrave Dictionary of Money and Finance, *The Macmillan Press*, London, pp. 248–255.

Hoque, H. A. A. B., Kim, J. H. & Pyun, C. S. (2007). A comparison of variance ratio tests of random walk: A case of Asian emerging stock markets, *International Review of Economics and Finance*, Vol. 16, pp. 488-502.

Joseph E. finnerty. (1974). Insiders and market efficiency, division of research. graduate school of business administration, university of Michigan, working paper no. 96.

Kim, J. H., & Shamsuddin, A. (2006). Are Asian stock markets efficient? Evidence from new multiple variance ratio tests, Mimeo, Department of Econometrics and Business Statistics, Monash University.

Levis, M. (1990). The winner's curse problem, interest costs and the underpricing of initial public offerings, *Econ. J.*, Vol. 100, pp. 76–89.

Lee, C.F., Chen, G.M., and Rui, O.M. (2001). Stock returns and volatility on China stock markets, *Journal of Financial Research*, Vol. 24, No. 4, pp. 523-543

Li, J., Zhang, L., Zhou, J. (2006). Earnings Management and Delisting Risk of Initial Public Offerings. Working Paper. University of Rochester.

Lim, U. (1992). The price mechanism of IPO market in Korea with emphasis on the recent liberalization Reform, *Pacific-Basin Capital Markets research,* Vol. 3, pp. 321-339.

Liu, L., Li, W.D. (2000). Research on first day's abnormal returns of IPOs in China's securities market. China, *Acc. Finan. Rev.*, Vol., 2, pp. 26–53.

Loughran, T., Ritter, J., Rydqvist, K. (1994). Initial public offerings: International insights, *Pacific-Basin Finance Journal*, Vol. 2, pp. 165–199.

Mc Guinness, P. (1992). An examination of the underpricing of initial public offerings in Hong Kong: 1980–90, *Journal of Business Finance and Accounting*, Vol.19, pp.165–186.

Muscarella, C.J., Vetsuypens, M.R. (1989). A simple test of Baron's model of IPO under-pricing, *Journal of Financial Economics*, Vol. 24, pp. 125–135.

Mok, H.M.K., Hui, Y.V. (1998). Under pricing and after market performance of IPOs in Shanghai, China, *Pacific-Basin Finan. J,* Vol. 6, pp. 453–474.

Rendleman, R.J., C.P. Jones and H.A. Latané (1987). Further insight into the standardized unexpected earnings anomaly: Size and serial correlation effects. *Financial Review*, Vol. 22, pp. 131-144.

Regúlez, M. and Zarraga, A. (2002). Common features between stock returns and trading volume, *Applied Financial Economics*, Vol. 12, No. 12, pp. 885-893.

Ritter, J.R. (1984). Signaling and the Evaluation of Unseasoned New Issues: A Comment, *The Journal of Finance*, Vol. 39, pp. 1231-1237.

Ritter, J.R., Welch, I. (2002) 'A review of IPO activity, pricing, and allocations', *J. Finance*, Vol. 57, pp. 1795–1828.

Robert J. Shiller. (2001). Human behavior and the efficiency of the financial system. Cowles foundation for research in economics Yale University, paper no. 1025

Rock,K. (1986). Why new issues are underpriced? *Journal of financial economics*, Vol. 15, pp. 187-212.

Rutterford, J. (1993). *Introduction to Stock Exchange Investment*, Second Edition, The Macmillan Press Ltd., London, pp. 281-308.

Ryoo, H.J. and Smith, G. (2002). Korean stock prices under price limits: Variance ratio tests of random walks, *Applied Financial Economics*, Vol. 12, No. 8, pp. 545-553.

Saunders, A., Lim, J. (1990). Under pricing and the new issue process in Singapore, *Journal of Banking and Finance*, Vol. 14, pp. 291–310.

Samuelson, P. (1965). Proof that Properly Anticipated Prices Fluctuate Randomly, *Industrial Management Review*, Vol. 6, pp. 41-49.

Smith, G., Jefferis, K., and Ryoo, H.J. (2002). African stock markets: multiple variance ratio tests of random walks, *Applied Financial Economics*, Vol. 12, No. 4, pp. 475-484

Will, M. (2006). The Role of Performances in an Accounting Scandal: An Insider's Perspective on How Things Went Wrong. *Paper No. 152 presented at 5th Global Conference on Business & economics,* Cambridge University, UK.

Wong, K.A., Chiang, H.L. (1986). Pricing of new equity issues in Singapore, *Asia Pacific Journal of Management*, Vol. 4, pp.1–10.

Xiao Chen, Chi-Wen Jevons Lee, Jing Li. (2008) 'Government assisted earnings management in China', *Journal of Accounting and Public Policy,* Vol., 27, pp. 262–274.

Table 1. Summary of IPO in Sample Period

Year category	Shanghai	Shenzhen	Total
1997	78	110	188
1998	49	46	95
1999	47	50	97
2007	24	102	126
2008	6	71	77
2009	6	37	43
Total	210	416	626

Table 2(a). Data Characteristics – SHZ and SHN – January 1997-December 1999 (Asian financial Crisis)

Index	Obser.	Mean	Median	Minimum	Maximum	Skewness	Kurtosis	Variance
SHZ	728	0.0003	-0.0006	-0.0946	0.0835	-0.219	3.609	0.0004
SHN	727	0.0007	0.0005	-0.0891	0.0758	-0.447	4.509	0.0003

Table 2(b). Data Characteristics – SHZ and SHN – January 2007-December 2009 (Global financial Crisis)

Index	Obser.	Mean	Median	Minimum	Maximum	Skewness	Kurtosis	Variance
SHZ	730	0.0005	0.0025	-0.0124	0.0101	-0.685	-0.646	0.00004
SHN	730	0.00008	0.0024	-0.0137	0.0081	-0.886	-0.450	0.00004

Table 3(b). First Day Market Adjusted Return during Asian Financial Circes

	Mean	Median	t-stat	Std-deviation
1997-1999	135.73	122.15	30.88	85.68
1997	158.89	138.76	32.74	93.10
1998	132.97	122.57	15.07	85.98
1999	110.89	94.50	10.94	99.84

Table 3(b). First Day Market Adjusted Return during Global Economic Circes

	Mean	Median	t-stat	Std deviation
2007-2009	145.20	110.06	21.36	106.62
2007	189.32	173.44	19.16	110.91
2008	119.44	84.64	11.78	88.96
2009	62	47.70	11.520	35.30

Table 4. Aftermarket Performance of IPO

	5th day	10th day	20th day	30th day	50th day	100th day	200th day	300th day
1997-1999								
Mean	135.04	133.95	133.15	133.02	132.57	133.84	136.82	140.32
Median	123.81	120.60	119.60	118.95	119.49	119.85	123.10	128.29
t-stat	31.13	30.76	30.62	30.62	30.77	30.87	31.10	31.14
Std-deviation	84.56	84.90	84.76	84.69	84	84.52	85.78	87.83
2007-2009								
Mean	140.70	139.57	138..07	137.09	151.17	148.34	147.96	145.20
Median	111.31	109.31	109.65	109.70	132.83	127.18	130.51	127.61
t-stat	21.07	21.21	20.99	21.40	21.33	19.57	20.15	19.45
Std-deviation	104.73	103.19	103.17	100.45	100.98	108	104.64	106.07
1997								
Mean	155.74	154.51	152.82	151.61	149.87	147.53	151.81	152.79
Median	139.32	137.10	132.07	130.69	132.69	129.18	132.48	134.69
t-stat	32.60	32.63	32.42	32.79	30.81	30.72	31.94	30.85
Std-deviation	92.51	91.69	91.26	89.54	88.44	92.99	92.05	95.90
1998								
Mean	133.70	133.50	133.94	134.18	134.46	138.11	136.37	135.53
Median	124.12	122.77	125.69	129.20	122.82	126.39	123.81	133.07
t-stat	15.08	14.96	14.86	14.93	14.94	15.39	15.59	15.75
Std-deviation	86.44	86.96	87.82	87.60	87.73	87.46	85.28	83.89
1999								
Mean	110.31	109.25	109.37	110.31	110.45	111.54	111.72	115.06
Median	92.18	95.49	92.77	97.37	88.52	94.89	96.83	104.55
t-stat	11.10	10.97	10.94	10.96	11.10	10.84	11.18	11.81
Std-deviation	97.89	98.05	98.52	99.12	97.98	101.39	98.42	95.93
2007								
Mean	185.12	183.74	182.25	179.40	176.65	171.69	161.14	160.88
Median	170.25	170.44	171.60	170.19	166.57	162.87	147.27	145.69
t-stat	19.14	19.37	19.25	19.43	19.34	17.19	16.05	16.43
Std-deviation	108.57	106.50	106.27	103.65	102.54	112.13	112.69	109.90
2008								
Mean	112.61	110.68	108.39	109.06	109.48	110.14	126.39	119.19
Median	81.52	82.21	87.32	90.66	94.05	98.70	106.32	97.82
t-stat	11.29	11.20	10.95	11.28	11.51	10.85	12.84	10.10
Std-deviation	87.51	86.74	86.89	84.81	83.50	89.11	86.35	94.47
2009								
Mean	60.88	61.87	61.74	63.31				
Median	50.49	56.05	57.97	58.14				
t-stat	11.74	11.78	10.88	10.76				
Std-deviation	33.98	34.43	37.21	38.57				

Table 5(a). Test statistics with intercept and no trend

Index	ADF test Statistics With 5 lags	DF-GLS test Statistics With 5 lags	PP unit root test (Newey-West Bandwith)	KPSS (Newey-West Bandwith)
SHZ	-5.900187	1.727347	-5.911941	0.207356
SHN	-4.742969	4.771136	4.735363	0.204108

Table 5(b). Critical values

Level	ADF Test	DF-GLS Test	PP unit root test	KPSS Test
1%	-3.632900	2.634731	-3.632900	0.739000
5%	-2.948404	1.951000	-2.948404	0.463000
10%	-2.612874	1.610907	-2.612874	0.347000

Table 6 (a). Test statistics with intercept and trend

Index	ADF test Statistics With 5 lags	DF-GLS test Statistics With 5 lags	PP unit root test (Newey-West Bandwith)	KPSS (Newey-West Bandwith)
SHZ	-5.864159	2.655333	-5.868968	0.117895
SHN	-4.847802	4.992151	-4.894173	0.079998

Table 6 (b). Critical values

Level	ADF Test	DF-GLS Test	PP unit root test	KPSS Test
1%	-4.243644	3.770000	-4.243644	0.216000
5%	-3.544284	3.190000	-3.544284	0.146000
10%	-3.204699	2.890000	-3.204699	0.119000

Table 7 (a). Test statistics with intercept and no trend

Index	ADF test Statistics With 5 lags	DF-GLS test Statistics With 5 lags	PP unit root test (Newey-West Bandwith)	KPSS (Newey-West Bandwith)
SHZ	-5.149318	-2.174585	-5.154930	0.180375
SHN	-5.522392	-2.205404	-5.514943	0.186881

Table 7 (b). Critical values

Level	ADF Test	DF-GLS Test	PP unit root test	KPSS Test
1%	-3.679322	-2.65014	-3.679322	0.739000
5%	-2.967767	-1.953381	-2.967767	0.463000
10%	-2.622989	-1.609798	-2.622989	0.347000

Table 8 (a). Test statistics with intercept and trend

Index	ADF test Statistics With 5 lags	DF-GLS test Statistics With 5 lags	PP unit root test (Newey-West Bandwith)	KPSS (Newey-West Bandwith)
SHZ	-5.258361	-2.609317	-5.279356	0.150786
SHN	-5.597081	-2.608892	-5.620397	0.144993

Table 8 (b). Critical values

Level	ADF Test	DF-GLS Test	PP unit root test	KPSS Test
1%	-4.309824	-3.770000	-4.309824	0.216000
5%	-3.574244	-3.190000	-3.574244	0.146000
10%	-3.221728	-2.890000	-3.221728	0.119000

An Exploration of the Relationship between CRM Effectiveness and the Customer Information Orientation of the Firm in Iran Markets

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Abstract

The firm's customer relationship management (CRM) system is frequently a central element of the knowledge management function of the firm. It integrates information from internal and external sources to guide managers and field personnel in the development and presentation of the firm's value proposition. But despite the widespread adoption of CRM systems by firms operating in business-to-business markets, there is continued management skepticism concerning the effectiveness of these systems and their association with the firm's overall "customer information orientation." The present study seeks to shed light on these topics by evaluating the relationship between the customer relationship orientation of the firm and its use of CRM, as well as the association of CRM use with overall firm performance in B-to-B settings across a range of traditional business performance measures. The authors employ a multi-method approach to determine the key variables, including: database currency, internal database utilization, database accuracy and performance based reward systems utilized to operationalize the construct "the firm's customer information orientation" in order to develop statistical measures of the relationships of selected variables. The results of the study provide support for the finding that customer information orientation is indeed associated with CRM system implementation and that CRM use is associated with firm performance in B-to-B markets.

Keywords: Customer relationship management, Knowledge management function, Business-to-business markets

Introduction

Organizational knowledge management, often referred to in practice as "the learning organization," is an important topic in the organizational literature. Alavi and Leidner (2001) define knowledge management as "the knowledge-based perspective [on organizations]" which "postulates that the services rendered by tangible resources depend on how they are combined and applied, which is in turn a function of the firm's know-how" (p. 107). Sun, Li and Zhou (2006) define this process as "adaptive learning," the process of using the firm's information to derive market and competitive intelligence.

The customer relationship management (CRM) system is a key to this process of continuous adaptation to the firm's

environments, which is the monitoring of external changes and adapting internal cultures and processes in response to external challenges (Senge et al., 1999). As a result, the number of implemented CRM systems, generally in the form of IT databases and communications systems has grown markedly during the past ten years (DeSisto, 2005).

In a survey conducted in 2004, 60% of midsized companies indicated their intention to initiate or expand their CRM usage, while only 2% indicated they currently had no plans to implement a CRM system (Neuborne, 2005). More recently, such shared on-demand Internet services as NetSuite, RightNow Technologies, Salesforce.com and CRM OnDemand have given smaller firms an opportunity to develop CRM capabilities at significantly lower capital outlays (Myron, 2005). The resulting solutions have improved efficiency within the narrow confines of traditional sales management, providing firms with real-time sales planning, sales team development, pipeline reporting and project tracking capabilities.

The firm's CRM system should identify factors important to clients, promote a consumer-oriented philosophy, use customer-based measures, develop end-to-end customer management processes to serve customers, provide customer support (including handling complaints), and track all aspects of sales. In other words the system should create a holistic view of customers' sales and services information. Superior strategy development and implementation is "achieved through open-minded inquiry, synergistic information distribution, mutually informed interpretations, and accessible memories."

"Accessible memory" is important because, as Day (1994) states, "market-driven inquiry, distribution, and interpretation will not have a lasting effect unless what is learned is lodged in the collective memory. Organizations without practical mechanisms to remember what has worked and why will have to repeat their failures and rediscover their success formulas over and over again" (p. 44).

Critics have observed that the implementation of a CRM solution is not sufficient to create a true "learning organization." Rather, organizations need to think across organizational functions to truly benefit from CRM. This requires "thinking across departmental boundaries in order to concentrate on adding value to the customer… [there is] the need for marketing to act as an integrating function in coordinating the organization's interaction with the customer" (Wilson, Daniel, & McDonald, 2002, p. 194–5). If properly implemented, the organization's CRM system is uniquely well positioned as a knowledge management tool, defined by Szulanski and Winter (2000), as a resource which promotes that (1) only best available practices are copied, (2) everyone works from the same active best practice template, (3) best practices are copied as closely as possible, (4) adopted practices are tested and adapted only after good results are achieved, and (5) best practice templates are kept in mind after their adoption by the organization. Therefore, CRM must be able to serve as the value creating interface between the firm's functional units (including those linked by an ERP) and its customers. However, there is no existing research to support the value of CRM in the broader context of the organization's customer information orientation, and specifically in the business-to-business market space.

Along these lines, Day (2000) has proposed that successful customer relationship strategies are associated with three organizational characteristics: (1) an organizational relationship orientation, (2) developing and utilizing knowledge of the customer, and (3) effectively integrating and aligning internal and external processes.

The focus of the present research is the operationalization and testing of the Day (2000) hypothetical construct as it relates to "customer knowledge orientation," in the B-to-B space, and the link between CRM use and firm performance. For the purposes of the study, customer knowledge orientation will be operationalized as a set of data collection, data management and information dissemination functions rather than as the strictly sales support process traditionally associated with CRM solutions.

2. Background

2.1. The integrated CRM system as a knowledge resource

According to Lemon, White, and Winer (2002), "the trend in marketing toward building relationships with customers continues to grow, and marketers have become increasingly interested in retaining customers over the long run" (p. 1). The large number of CRM implementations over the past decade can be seen "as a contemporary response to the emerging climate of customer churn, waning brand loyalty and lower profitability" (Agrawal, 2003, p. 151). Furthermore, "CRM is central to the task of making an organization customercentric [and] is the surest symbol embracing information technology in business [and] the most certain way to increase value to the customers and profitability to the practicing organizations" (p. 151).

Research conducted by Deshponde, Webster and Farley (1993) supports the view that "firms with cultures that are relatively responsive ([to their] market) and flexible ([act as an] adhocracy) outperform more onsensual (clan[nish]) and internally oriented, bureaucratic (hierarchical) cultures" (p. 31). As the repository of the firms' sales history,

customer profiles and on-going promotions activities, a comprehensive and integrated CRM may be a crucial element of the firms' marketing strategy.

2.2. The structure and success factors of the dynamic CRM system

Integrated CRM, however, is more than the tool and symbol of the new relationship marketing. It is, in fact, an integrated strategy solution intended to maximize synergies across all of the firm's existing programs targeting relevant customer communities. For example, "it [can] more precisely measure the impact of a particular promotion on sales and profits" for the firm and its channel partners (Rigby & Ledingham, 2004, p. 121). A comprehensive and integrated CRM capability must therefore at minimum store customer, competitor and general market information; organize the information for multiple uses; retrieve the information when and where it is needed; and update this information in real time for key constituencies of the firm. Fig. 2 summarizes the integrated CRM framework.

Achrol and Kotler (1999) observe that "the classic hierarchical organization of the twentieth century is focused on the technologies of production. It is designed to economize on the bounded rationality of top management and minimize the governance costs of sequential adaptation to contingencies. But the challenge posed by knowledgerich and dynamic industries is to create organizations that are maximally open to their environments and can approach a state of more or less continuous adaptation to fluid environments. This calls for organizations that are "focused on processing information and creating knowledge" (Achrol & Kotler, 1999, p. 148). The answer is to develop continuous information exchanges between the firm and its constituencies, and in particular the major customer groups that define the "dynamic markets" so critical to the survival and growth of the firm.

2.3. CRM and customer knowledge orientation

Sun et al. (2006) define a primary purpose of CRM systems as "adaptive learning." This is the process of "[extracting] hidden predictive information from large databases to identify valuable customers, learn about their preferences, predict future behaviors, and estimate customer value" (p. 83). In this sense, the CRM system is an integral part of the "learning organization" as described by Senge et al. (1999). Learning organizations are continually adaptive to their environments, monitoring external changes and adapting their internal cultures and processes to the changes surrounding them. Firms that undertake this sort of "active learning" tend to approach the process in an entirely different way. Rather than utilizing a campaign-focused model of identifying customers with a potential need for the firm's "next solution," active learner firms seek to better understand customers' needs in their latent form in order to operationalize an optimal solution in the form of the firm's next value proposition (Edwards & Allenby, 2003). In order to serve this purpose, the CRM system must be more than a repository of transactional information. It must include in-depth account plans, customer survey results, customers' self-re ported consumption and applications information, and a detailed record of the firm's interactions with customer personnel (Rust & Verhoef, 2005).

Rather than taking a retrospective view of their customer markets, active learners utilize their CRM systems for modeling customers' selfperceived needs from direct and trace information stored in the data warehouse. Differences in the perceived needs of various customer clusters drive the development of a set of solutions for individual clusters, or groups of customers. By contrast, active learning organizations seek to find consistencies within individual accounts, providing specifically targeted solutions based on the firm's in-depth knowledge of these customers.

3. Conceptual framework and hypotheses

3.1. Conceptual framework

Based on the Day (2000) hypothetical construct and the literature on customer communities, we propose that (1) relationship orientation, knowledge orientation and aligned internal and external resources are related to the use of CRM systems in B-to-B markets; and (2) CRM implementation is related to the performance of the firm in the B-to-B market space. This model is shown in Fig. 3.

3.2. Research hypotheses

3.2.1. Customer knowledge orientation

Knowledge management is the primary function of the CRM system, so it follows that knowledge orientation is a key characteristic of firms that successfully implement integrated CRM solutions in B-to- B markets. Kohli and Jaworski (1990) assert that "market intelligence is a broader concept than customers' verbalized needs and preferences in that it includes an analysis of exogenous factors that influence those needs and preferences" (p.3). Environmental factors, including the state of technology and the cyclicality of the industry and the overall economy, must also be considered in evaluating the firm's strategic options. Moreover, an integrated CRM must provide more than customer preference data, since the customer frequently knows only what s/he has seen or used. Possibilities

outside the customer's existing conceptual framework are often difficult if not impossible for him/her to understand, much less communicate.

The integrated CRM must therefore pick up patterns of use and recurring product/service/support issues that the customer may overlook or be unable to effectively communicate. This requires "organizational learning," defined by Slater and Narver (1995) as "the development of new knowledge or insights that have the potential to influence behavior" (p. 63). Adaptive learning is "the most basic form of learning [which] occurs within a set of recognized and unrecognized constraints (i.e., the learning boundary) that reflect the organization's assumptions about its environment and itself" (p. 63).

On the other hand, "generative learning occurs when the organization is willing to question long-held assumptions about its mission, customers, capabilities, or strategy. This requires a new way of looking at the world based on an understanding of the systems and relationships that link key issues and events" (p. 63). This continuous learning process is supported by "knowledge management" (Shoemaker, 2001, p. 178).

CRM supports the process of adaptive, or active, learning by helping the sales organization, management, customers, resellers and suppliers to better understand the impact of new implementation and use patterns of products and services supplied by the firm. An effective CRM must facilitate the development of a knowledge orientation in each of the firm's stakeholders. Organizational knowledge orientation means that (1) only best available practices are copied, (2) everyone works from the same active best practice template, (3) best practices are copied as closely as possible, (4) adopted practices are tested and adapted only after good results are achieved, and (5) best practice templates are kept in mind after their adoption by the organization (Szulanski & Winter, 2000).

H1. The relationship of „customer knowledge orientation to "CRM use" is positive in B-to-B markets.

3.2.2. CRM and firm performance

The final test of an integrated CRM, as for any major capital outlay or operating expense, is its contribution to the viability and growth of the organization. Key measures of CRM performance therefore include profitability, account sales and account gross margins. As Agrawal (2003) points out: "The key dimensions of CRM that were largely ignored in the past are customer loyalty and customer profitability" (p. 153). Research shows that an increase in customer loyalty by 5% could increase profits in telecom by over 50%, and a study by ICL for a UK Telco showed that a 10% churn in the top 10% of profitable customers would reduce profits by more than 25%. In presenting their model of customer value, Gupta, Lehmann, and Stuart (2004) observe that "Customer retention is one of the most critical variables that affect customers' lifetime profit" (p. 12).

Nemati, Barko, and Moosa (2003) support the view that "CRM has become a key process in strengthening of customer loyalty… customers no longer guarantee their loyal patronage, and this has resulted in organizations attempting to better understand them, predict their future needs, and to decrease response times in fulfilling their demands" (p. 74).

H2. The relationship of "CRM useto" "firm performance" is positive in B-to-B markets.

4. Study method

This study employs a multi-method approach, including small group in-depth interviews of organizational management teams and large sample CRM user and non-user surveys. The multi-method approach of this research incorporates a range of sources and data collection strategies to give depth and dimensionality to the research data. The group in-depth interviews serve as exploratory research in order to effectively frame the research problems. The user and nonuser surveys provide the scaled data to test the resulting hypotheses.

4.1. Sample characteristics

The survey sample was drawn from a broad range of industries with generally high CRM system development. Although these industries are at varying levels of sophistication and advancement with regard to CRM technology, each has participants with significant experience with CRM development and use in B-to-B markets (Yu, 2001). Respondents were selected based on their responsibilities in conjunction with their self-identified expertise concerning CRM usage and performance. In-depth group interviews were conducted within seven selected firms that volunteered to participate in the study (see Appendix). These interviews lasted between one and 3 h at the host firm's offices and/or over the telephone with a small number of managers (generally between three and five) from each firm.

Subsequently, e-mail messages were exchanged with these respondents for the clarification and amplification of their comments and responses. The interview guide that was employed for these discussions (see Exhibit B) was open-ended and designed to engender discussion to raise key issues for the large-scale user survey.

4.2. Sampling frame

Survey respondents that currently have CRM systems and those that do not currently have system implementations were sourced from the Vendor Compliance Federation (VCF), a Division of Trading Partners Collaboration, a not-for-profit organization dedicated to business-to-business customer relationship development. VCF membership is composed of middle and upper level managers in organizations involved in business-to-business strategy formulation and operations. The membership of VCF represents a wide range of industries and industry roles. Based on available descriptions, this membership appears to be highly representative of the general population of CRM users.

The request to the VCF membership yielded 206 usable survey questionnaires from CRM users and non-users. 107 of these respondents indicated that their organization does not currently have a CRM system; 99 respondents indicated that their organization currently has an operational CRM system. Respondents were directed to complete the survey using an Internet-based instrument. Telephone calls to selected respondents were made by VCF officers to encourage a high response rate of the membership. In addition, those who were contacted concerning the survey were asked to pass the URL to other possible respondents. This "snowballing" technique was intended to increase the sample population and to extend the diversity of respondents in order to more closely reflect the overall population of CRM system users.

A general consensus among in-depth group interview participants was observed in the areas of system description, customer and vendor relationships, CRM benefits and overall organizational performance.

This was the basis for the decision concerning the use of key informants for conclusive research. Minimum sample size was determined by the demands of each specified method and the selected data analysis technique.

4.3. Research design, questionnaire and scale development

Because validated scales are not available for the defined latent construct, customer knowledge orientation, it was necessary to develop a range of questions for pre-testing. These scale items were derived from a search of the existing literature on the topics of customer knowledge orientation and firm performance. Several peer reviewed articles have addressed these constructs one dimensionally, and have published scale items for each dimension. These questions were subjected to three rounds of questionnaire pre-testing by the management teams involved in the preliminary in-depth interviews.

Following each round of reviews, the proposed changes were presented to the original respondents from each team. At each round the questions were further refined and new questions were added based on these responses. Managers were asked to review the resulting questionnaire for (1) ambiguous wording, (2) doublebarreled questions, (3) loaded questions, and (4) questionnaire structural and visual issues. At each revision, an attempt was made to eliminate biases and to expand or contract the scope of the questions, as appropriate.

Respondents were asked questions in five major areas: (1) the characteristics of the organization; (2) the form and extent of the firm's CRM implementation; (3) the perceived success of CRM system implementation with regard to customer retention and a range of other firm performance criteria; (4) the existence and form of the firm's customer communities; and (5) the relationship of the firm with its customers. Where appropriate, seven-point Likert-type scales were used (e.g., 1 = strongly disagree to 7 = strongly agree). Throughout the study, consistent with standard practice (Flora & Curran, 2004), ordinal data has been treated as continuous data in order to facilitate interpretation. The survey data was subjected to factor analysis to identify any new factors which should be considered in the study.

4.4. Reliability and validity

Cronbach's alpha was used to evaluate reliability. For the purposes of exploratory research a Cronbach's alpha of .7 or .8, and sometimes as low as .6, is generally deemed adequate (Peterson, 1994). A review of the literature did not identify existing validated scales directly associated with the latent construct, customer knowledge orientation.

However, several peer reviewed articles have addressed this construct one dimensionally (as individual scale items rather than as related items) and have suggested scale items for operationalizing "customer knowledge orientation" (Kohli & Jaworski, 1990; Shoemaker, 2001; Slater & Narver, 1995; Szulanski & Winter, 2000).

This research is reliant on nomological validity to the extent to which predictions from the accepted network of theory are borne out in the new measures developed in this study (Bagozzi, 1994). The newly measured constructs "behave" in expected ways in relation to other well understood constructs, and this contributes to confidence in the new measures. From the earliest stages of this research, nomological and face validity were also the basis for selection and testing of the appropriate variables. "Nomological validity is a form of construct validity. It is the

degree to which a construct behaves as it should within a system of related constructs called a nomological set" (Bagozzi,1980, p.182). Face validity "is concerned with howa measure or procedure appears. Does it seem like a reasonable way to gain the information the researchers are attempting to obtain? Does it seem well designed? Does it seem as though it will work reliably?" (Fink, 1995, p.261) Furthermore, we rely on face validity, as described by Anastazi (1998): "[Face validity] is not validity in the technical sense; it refers, not to what the test actually measures, but to what it appears superficially to measure. Face validity pertains to whether the test, looks valid" to the examinees who take it." (p.144).

Data analysis proceeded in three stages in order to develop a measurement model and a confirmatory model. Factor analysis was employed to identify latent variables and to determine the relationships of individual items to their posited, underlying structures (Hunter & Gerbing, 1982, Özsomer, Calantone, & Di Benedetto, 1997).

Principal factor analysis (PFA or factor analysis) is used to verify the one dimensionality of the measures. Convergent validity is inferred from the significance of coefficient loadings and their magnitudes.

This method is intended to assess and validate the descriptive and predictive value of the measurement model of CRM use and customer knowledge orientation. Item measures that pass the significance test but have a standardized factor loading of approximately less than 0.6 were eliminated from the model (Nunnally, 1978).

To the degree that the one dimensional latent variable identified in the literature is supported by the results of t-tests and analyses of variance (ANOVA), this research relied on a convergence of research findings to validate those findings. Differences of methodology and analytical schema have the effect of reducing the value of this approach, but it remains one factor in determining convergent validity.

5. Study findings

Study findings were analyzed using factor analysis to determine the association of the scale items as a set of latent factors for all respondents and for only CRM users. This was followed by a set of independent-sample t-tests to determine the association of the reduced set of independent variables identified in the factor analysis, the scale items associated with customer knowledge orientation and the dependent variable "CRM use." Analyses of variance (ANOVA) were conducted to determine the relationship of CRM implementation with firm performance using a set of firm performance dimensions.

5.1. Data reduction

Factor analysis was employed to verify the one dimensionality of the scale measures derived through the questionnaire survey. An inference of convergent validity can be based on the significance of coefficient loadings and their magnitudes as a set of latent constructs.

The factor analysis of all 206 respondents, including both CRM users and non-users, employing Varimax rotation, of the scaled items yielded four factors, which may be defined as "customer knowledge orientation" (Factor 1), "customer relationship orientation" (Factor 2), "customers' community orientation" (Factor 3), and "internal and external organizational alignment" (Factor 4). See Table 1a. This result is suggestive of H1, "The relationship of customer knowledge orientation" to "CRM implementation" is positive." Only scale items with significant loadings are reported; items with loadings approximately below 0.6 have been eliminated according to common practice (Nunnally, 1978). The analysis of the proposed items yielded four factors, including "customer knowledge orientation" (Factor 1), "customer relationship orientation," (Factor 2), "customers' community orientation" (Factor 3), and "internal and external organizational alignment" (Factor 4). This is further suggestive of H1, "The relationship of „knowledge orientation" to „CRM implementation" is positive."

See Table 1b.

5.2. Customer knowledge orientation

Independent-samples t-tests of the variables associated with customer knowledge orientation support the finding of a relationship with CRM use (Table 2). A significant relationship between CRM use was found in the case of the scaled questions, "marketing databases are kept up-to-date," "managers utilize market information from internal databases," "the accuracy of information in the marketing databases is actively monitored" and "performance-based vendor and service

Moreover, a number of those interviewed concerning the organizational and market characteristics associated with successful CRM implementation identified customer knowledge orientation as critical for success. "Our CRM system is one of many tools we employ to better understand our customer needs and purchasing behavior. I can't tell you the specific role of our CRM system, but it is significant in tying it all together" (Vice President of Distribution for a major electronics components distributor). "Our organization collects an enormous amount of information

concerning our customers. That's what we do… we analyze our customers' buying patterns, expenditure levels and their stated interests" (Director of Marketing for a multi-media consumer merchandiser). "Our customers feel that they have a close relationship with us. They rely on us for solutions and… [our customers] give us as much help in developing the right solutions as they can" (Director of Sales for an information systems developer).

5.3. CRM use and firm performance

Independent-samples t-test of the year-over-year change in firm performance and CRM use supports a relationship between CRM use and firm performance, as defined by survey respondent reported yearover- year firm performance improvement in overall profitability, sales force productivity, customer retention, average account sales and average account gross margins. See Table 3. Therefore, H2, "The relationship of „CRM use‟ to „firm performance‟ is positive in B-to-B markets" is supported.

The relationship of CRM systems and organizational profitability was mentioned by managers in group interviews. "We could never be as profitable without our customer databases… We continuously upgrade our customer information systems because it's what drives our business" (Director of Marketing for a multi-media consumer merchandiser). "Our CRM system is the heart of our sales and marketing activities… We make all of our product line and customer care decisions after analyzing our CRM data…We would be a lot less successful without it" (Vice President of Distribution for a major electronics components distributor).

This finding is further confirmed by an analysis of variance (ANOVA) of the mean value of the scale items associated with customer knowledge orientation, which is found to be significant (f stat=2.97; deg. of freedom=15; sig. b.001).

5.4. Firm performance and CRM implementation level

A significant relationship has been established for CRM use and the year-over-year change in firm performance in terms of overall profitability, sales force productivity, customer retention, average account sales and average account gross margins. This is further confirmed by the reported association of the latent construct, customer knowledge orientation, with the mean of the year-overyear organizational performance variables, the scaled questions "overall profitability?" "sales force productivity?" "customer retention?" "average account sales?" and "average account gross margins?"

An extension of these analyses is the determination of whether the level of CRM implementation is associated with the firm's performance. To answer this question, an analysis of variance (ANOVA) was performed for the full set of scale items posited to have an association with customer knowledge orientation, along with the set of scaled CRM performance variables.

The results indicate a limited relationship between these organizational performance variables and the level of CRM integration, including these classifications, from lowest to highest level of system implementation: Level 1: "we have a system which performs primarily as a sales support system;" Level 2: "we have a CRM system which serves as an integrated account planning and account management system;" and Level 3: "we have a system which serves as an integrated account planning and account management system and as a management reporting system." See Table 4.

The results were significant for questions "overall profitability?" "average account sales?" "average account gross margins?" and "important external vendors and service providers are treated as members of the firm's organization." Higher level implementations of CRM systems, those with greater integration with the firm's strategic and resource planning functions, are therefore associated with the firm's sales productivity and profitability.

6. Discussion of managerial and research implications

The present study has proposed a set of organizational characteristics, as represented bya setof "customer information orientation" scale items, associatedwith the implementation of CRM systems in businessto- business settings. The preliminary findings are suggestive and do not identify clearly causal relationships of the construct, customer knowledge orientation, with the organizational use of CRMsystems. A number of factors make a clear determination of causation problematic, including the heterogeneity of firm organizations (and their CRM implementations) and the concomitant use of CRM and related resources for multiple organizational applications. Internal and external organizational environmental conditions further complicate a determination of causality in the factors leading to CRM use, as well as the resulting association of CRM with overall firm performance. As the in-depth exploratory interviews suggest, the concept of a "CRM system" in B-to-B applications may be interpreted differently by both systems users and non-users. To some executives, the CRM system is a logical extension of the sales management function, i.e., a better way to manage the sales organization. To other executives, CRM connotes a strategic marketing function, which is focused on the development of in-depth account plans and a team selling

approach.

The results of this research provide qualified support for a finding of a relationship of the latent construct "customer knowledge orientation" with CRM use in B-to-B markets. Although still vague, this construct, as operationalized in this and other studies, is identified in the proposed model as a characteristic of the organization.

A contribution of this study is in presenting this organizational characteristic as an identifiable, albeit less than perfectly measurable, construct. Study results clearly demonstrate that the operational variables may be applied jointly as predictors of CRM use. As many of the in-depth group interviewees made clear, the firm's customer-centeredness is closely associated with the breadth, depth and quality of customer information sought and collected by the firm.

There is no ambiguity concerning the potential value of a CRM system to the respondent population. There is clear support for the contention that CRM use, in B-to-B markets, is associated with firm performance improvement in overall profitability, sales force productivity, customer retention, average account sales and average account gross margins. Since these are the criteria most frequently emphasized by in-depth group interview participants, the survey results clearly present the value of CRM to the firm. Furthermore, this research clearly indicates the benefits of higher order CRM systems, those with integrated account planning, account management and management reporting capabilities. Firms employing higher order CRM capabilities had a statistically significant performance improvement over users with less evolved systems.

7. Research limitations and future research

The present research utilizes both in-depth interviews and a large sample questionnaire survey to improve understanding of CRM and its association with the firm's customer information orientation. As is the case with most empirical research, the present survey research has several limitations associated with the identification of latent constructs, the operationalization of those constructs and the collection of survey data for testing those operationalized constructs.

This may introduce some biases to the research. One way that future research may avoid some resulting biases is to undertake longitudinal studies with a sufficiently large and representative B-to-B sample population. By staggering the collection of data related to independent and dependent variables, it may be possible to more effectively link user and non-user behaviors with organizational outcomes (Duchon & Kaplan, 1988). Related to this time-lapse limitation, the present survey study utilizes a cross sectional design, which limits the extent to which causality can be inferred.

In order to address these various shortcomings, future research should employ varied CRM and organizational contexts and research designs to determine whether the model provides a satisfactory, consistent explanation for the determinants of business-to-business CRM use and related performance outcomes. Additional research would also help to determine the conditions under which the various performance factors may vary, and the extent to which these factors are independent of other organizational, industry and other environmental factors. A replication of the present study using other sample populations, definitions of CRM and organizational and performance criteria will serve to improve the external validity of the findings, and to validate the robustness of these relationships across different B-to-B CRM implementations and usage contexts.

References

Achrol, R. S. (1991). Evolution of the marketing organization: New forms for turbulent environments. *Journal of Marketing*, 55, 77−94.

Achrol, R. S. & Kotler, P. (1999). Marketing in the network economy.*Journal of Marketing,* 146−163 Special Issue 1999.

Agrawal, M. L. (2003). Customer relationship management (CRM) & corporate renaissance. *Journal of Services Research*, 3, 149−171.

Alavi, M., & Leidner, D. E. (2001). Review: Knowledge management and knowledge management systems: Conceptual foundations and research issues. *MIS Quarterly*, 25, 107−136.

Crotts, J. C., Dickson, D. R., & Ford, R. C. (2005). Aligning organizational processes with mission: The case of service excellence. *Academy of Management Executive*, 19, 54−68.

Day, G. S. (1994). The capabilities of market-driven organizations. *Journal of Marketing*, 58, 37−52.

Day, G. S. (2000). Managing market relationships. *Journal of the Academy of Marketing Science*, 28, 24−30.

Day, G. S. & Wenseley, R. (1988). Assessing advantage: A framework for diagnosing competitive superiority.

Journal of Marketing, 52, 1−20.

Deshponde, R., Webster, F. E., & Farley, J. U. (1993). Corporate culture, customer orientation, and innovativeness. *Journal of Marketing*, 57, 23−38.

Duchon, D., & Kaplan, B. (1988). Combining qualitative and quantitative methods in information system research: A case study. *MIS Quarterly*, 12, 571−585.

Journal of Marketing Research, 40, 321−334.

Flora, D. B., & Curran, P. J. (2004). An evaluation of alternative methods for confirmatory factor analysis with ordinal data. *Psychological Methods*, 9, 466−491.

Gupta, S., Lehmann, D. R., & Stuart, J. A. (2004). Valuing customers. *Journal of Marketing Research*, 41, 7−18.

Kohli, A. K., & Jaworski, B. J. (1990). Market orientation: The construct, research propositions, and managerial implications. *Journal of Marketing*, 54, 1−18.

Lemon, K. N., White, T. B., & Winer, R. (2002). Dynamic customer relationship management: Incorporating future considerations into the service retention decision. *Journal of Marketing*, 66, 1−14.

Myron, D. (2005). Back to double-digit growth. *CRM Magazine*, 9, 31.

Nemati, H. R., Barko, C. D., & Moosa, A. (2003). "E-CRM analytics: The role of data integration. *International Journal of Electronic Commerce in Organizations*, 1, 73−89.

Peterson, R. A. (1994). A meta-analysis of Cronbach's coefficient alpha. *The Journal of Consumer Research*, 21, 381−391.

Rigby, D. K., & Ledingham, D. (2004). CRM done right. *Harvard Business Review*, 82, 118−129.

Rust, R. T. & Verhoef, P. C. (2005). Optimizing the marketing interventions mix in intermediate-term CRM. *Marketing Science*, 24, 477−489.

Simmons, L. C., & Munch, J. M. (1996). Is relationship marketing culturally bound? A look at guanxi in China. *Advances in Consumer Research*, 23, 92−96.

Slater, S. E., & Narver, J. C. (1994). Market orientation, customer value, and superior performance. *Business Horizons*, 37, 22−28.

Slater, S. E. & Narver, J. C. (1995). Market orientation and the learning organization. *Journal of Marketing,* 59, 63−74.

Sun, B., Li, S. & Zhou, C. (2006). "Adaptive" learning and "proactive" customer relationship management. *Journal of Interactive Marketing*, 20, 82−96.

Szulanski, G. & Winter, S. (2000). Getting it right the second time. *Harvard Business Review*, 80, 62−69.

Wyner, G. A. (1999). Customer relationship management. *Marketing Research*, 11, 39−41.

Yu, L. (2001). Successful customer-relationship management. *MIT Sloan Management Review*, 42, 18−19.

Zack, M. H. (1999). Developing a knowledge strategy. *California Management Review*, 41, 125−146.

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Table 1a. Factor analysis: CRM users and non-users using varimax rotation

	Factor 1	Factor 2	Factor 3	Factor 4
Q8e: The development of detailed account plans is a high priority.		.872		
Q8f: Marketing databases are kept up-to-date	.745			
Q8g Sharing information with customers is considered important		.624		
Q8h: Important external vendors and service providers are treated as members of your firm's organization				.784
Q8i: Customers have a significant level of input to the firm's marketing strategy.		.591		
Q8j: Managers utilize marketing information from internal databases	.743			
Q8p: There are methods for resolving differences between your firm and its verdors and service providers				.773
Q8q: The accuracy of information in the marketing databases is actively monitored.	.723			
Q8r: Performance-based vendor and service provider reward systems are unilized	.660			
Q9h: Your firm's customers are willing to share sensitive operational information with the firm				.613
Q10a: Your firm's customers regularly keep in contact with one another			.883	
Q10b: Your firm's customers share purchase(price,availability, retailer,etc) information with other customers			.887	
Q10c: Your firm's customers advise each other concerning the use of your firm's product.			.826	

Table 1b. Factor analysis: CRM users only using varimax rotation

	Factor 1	Factor 2	Factor 3	Factor 4
Q8e: The development of detailed account plans is a high priority.		.850		
Q8f: Marketing databases are kept up-to-date	.753			
Q8h: Important external vendors and service providers are treated as members of your firm's organization				.682
Q8i: Customers have a significant level of input to the firm's marketing strategy.		.651		
Q8j: Managers utilize marketing information from internal databases	.684			
Q8l: Customer satisfaction is a high priority		.741		
Q8o: Customer retention is a high priority		.662		
Q8p: There are methods for resolving differences between your firm and its verdors and service providers				.751
Q8q: The accuracy of information in the marketing databases is actively monitored.	.658			
Q8r: Performance-based vendor and service provider reward systems are unilized	.668			
Q9b: Your firm's customers are an important source of planning information for your firm		.653		.
Q10a: Your firm's customers regularly keep in contact with one another			.785	
Q10b: Your firm's customers share purchase(price,availability, retailer,etc) information with other customers			.868	
Q10c: Your firm's customers advise each other concerning the use of your firm's product.			.775	

Table 2. *T*-test of "customer knowledge orientation" variables

	N	Mean	*T*-stat	Sig. (2-tailed)
Q8f: Marketing databases are kept up to date				
CRM No	101	3.67	5.39	.000
CRM Yes	95	4.72		
Q8j: Managers utilize market information from internal databases.				
CRM No	104	3.85	5.11	.000
CRM Yes	97	4.77		
Q8q: The accurary of information in the marketing databases is actively monitored				
CRM No	103	3.73	5.02	.000
CRM Yes	97	4.73		
Q8r: Performance-based verndor and service provider reward systems are utilized.				
CRM No	75	3.39	1.92	.056
CRM Yes	76	3.89		

Table 3. *T*-test of "firm performance" variables with "CRM use"

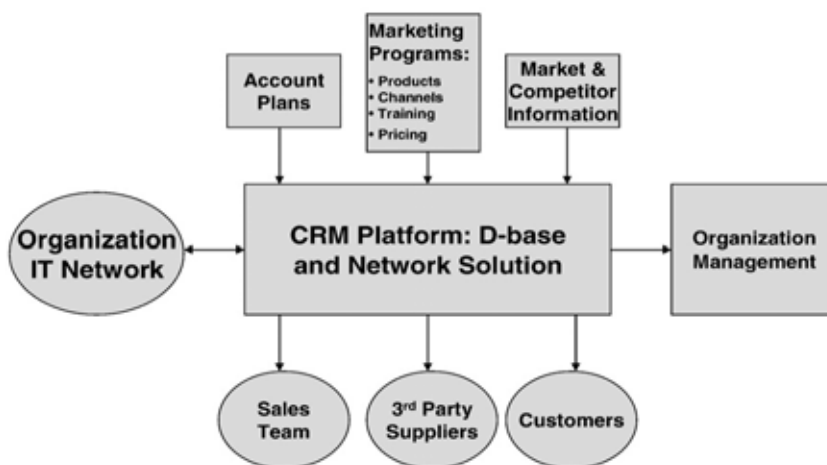|	*N*	Mean	*T*-stat	Sig. (2-tailed)
Q6a: Overall profitability?				
CRM No	46	4.15	2.28	.024
CRM Yes	95	4.49		
Q6b: Sales force productivity?				
CRM No	45	3.98	3.23	.002
CRM Yes	92	4.48		
Q6c: Customer retention?				
CRM No	45	3.67	4.25	.000
CRM Yes	92	4.40		
Q6d: Average account sales?				
CRM No	45	4.02	2.46	.015
CRM Yes	93	4.41		
Q6e: Average account gross margins				
CRM No	46	3.87	3.51	.001
CRM Yes	95	4.41		

Figure 1. Stein, M. Smith / Industrial Marketing Management 38 (2009) 198–206
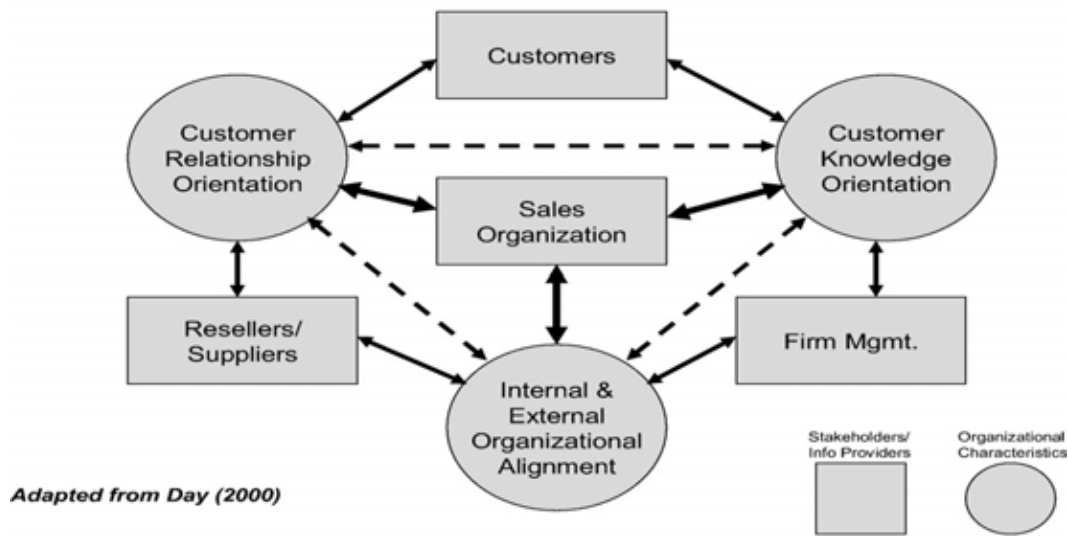
Figure 2. Major CRM integration elements.

Figure 3. Conceptual model: CRM implementation and customer community effect on customer relationships

Impacts of Venture Capital on Development
of Sichuan High-Tech Enterprises

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Abstract

The international financial crisis is encouraging new science and technology revolution and industrial revolution. To accelerate the transformation of economic development mode is urgent. We must pursue for an innovative development. Venture capital will play a greater role in the process. In this paper, authors start from describing the current development of venture capital and high-tech enterprises in Sichuan province, and make a model analysis of them. By means of a case study of Chengdu Geeya Technology Co., Ltd, authors conclude that there is a strong correlation between venture capital and high-tech enterprises. Sichuan province should focus on developing venture capital and promoting the development of high-tech enterprises.

Keywords: Venture capital, High-tech enterprise, Development

1. Introduction

Today, the world new technology revolution flourishes and the trend of economic globalization grows. High technologies and the industry pioneered by information technology are in a sudden emergence. Humans are entering an age of knowledge economy. High technologies are increasingly becoming the booster of social economic development. To change high technology into productivity, we must develop venture capital. From the current conditions of Sichuan province, venture capital is not the "catalyst" for the development of high- tech enterprises. The venture capital of Sichuan province is insufficient for the transformation of scientific and technological achievements and the development of scientific and technological enterprises. There is an urgent request for studying the effective integration of venture capital and high-tech enterprises in Sichuan province.

China's venture capital starts in the mid-80s. After entering the 90s, a large number of international venture capital funds and companies rush into China, inputting more funds into China's venture capital industry, bringing about new risk management technologies and standard risk operation mechanism, and finally promoting the development of China's venture capital industry. During the late and mid-90s, the venture capital industry develops fast in China. From 1997 to 2000, the average annual growth rate of venture capital agencies reaches 68.7%, and the average growth of total venture capitals reaches 74.6% over the same period (Fugong Yu, 2009). Promote the development of high-tech industry by developing the venture capital industry and achieve the economic growth. Compared with developed countries, although China's venture capital industry faces more problems, its development supplies sound bases for the development of local venture capital industry.

2. The development of venture capital and high-tech enterprises in Sichuan province

2.1 The development of high-tech enterprises in Sichuan province

Sichuan province has strengths in science and technology. It has competitive advantages in developing the high-tech industry. Firstly, Sichuan province has rich scientific and technological resources: 78 colleges and universities, 30 national scientific research institutes, 11 key national laboratories, 10 key national laboratories of defense technology, 11 national engineering technology centers, 22 national enterprise technology development centers, and 1,590,000 professionals (ranking No.6 in China, including 59 academicians). The comprehensive scientific and technological power of Sichuan province is at the top level in China (Jiming Cai, et al., 2010, p75-77). Secondly, Sichuan province has superior fields. Lots of national backbone enterprises, such as Dongfang Electric Corporation, Pangang Group, and Erzhong Group, have gained initial achievements in six fields: electric information, aeronautics

and astronautics, advanced manufacturing, new materials, biological engineering, nuclear technology, and new energy.

The contribution of high-tech enterprises rises steadily. In 2009, the added value of high-tech industry in Sichuan province is 124.14 billion Yuan, nearly three times in 2006. The contributed share to Sichuan GDP rises from 4.9% in 2006 to 8.8% in 2009. The industrial added value share rises from 13.4% to 21.8%. The contribution rate to GDP rises from 7.97% to 24.7%. The percentages in 2008 drop slightly, because of the international financial crisis and Wenchuan earthquake. But in 2009, it recovers quickly and realizes substantial growth (see Table 1).

The proportion of R&D expenses from government decreases annually. In Sichuan province, the R&D expenses are mostly from provincial government, accounting for 50% of the total. Few are from enterprises or individuals. But in recent years, the proportion of funds from government decreases annually, from 55.57% in 2003 to 42.15% in 2007 (the data in 2008 is an exception due to the impacts from international financial crisis and Wenchuan earthquake), and the proportion of funds from enterprises rises gradually (see Table 2).

Most high-tech enterprises are private. In 2009, the number of national high-tech enterprises is more than 1000 in Sichuan province, being the seventh in China. Sichuan has 40,000 high-tech enterprises statistically, at a leading position in western area considering the development speed and quality. From the composition of high-tech enterprises in Sichuan province, 44.1% are state-owned, 45.7% are private, and 10.2% are funded by Hong Kong, Macao, Taiwan, and foreign agencies. These percentages indicate that we should introduce more Hong Kong, Macao, Taiwan, and foreign-owned enterprises into the high-tech industry in an open way. The large proportion of R&D expenses from private enterprises means that more and more enterprises emphasize on high technologies, and seize the opportunity of developing economy by high technologies.

Three reasons contribute to the fast development of high technologies in Sichuan province. The primary reason is that Sichuan province has lots of innovative scientists and rich high-quality resources. It is a province with advanced science and technology, developed military industry, and rich talents. But it still needs venture capital. Secondly, Sichuan has good economic environment and comfortable life environment. It is well known that Chengdu is a city persuading people to stay. Chengdu is the place for pleasure, innovation, and entrepreneurship. People can do business and enjoy life at the same time. Thirdly, provincial government carries out the policy of encouraging innovation.

2.2 The development of venture capital in Sichuan province

The period from 1999 to 2002 is the golden term for venture capital agencies in Sichuan province. Triggered by the rise of Hong Kong GEM (Growth Enterprise Market) and the preparation of domestic GEM, not only local venture capital agencies have been established in Chengdu city, but some foreign venture capital firms set up branches and invest in high-tech projects there. However, afterwards it has been in a downturn state. Till 2009 the GME has been approved, venture capital agencies are alive again. But generally speaking, the venture capital industry in Sichuan province is still at the starting stage, lagging far behind the provincial economic development and the development of eastern venture capital industry. Especially, the undeveloped local venture capital agencies can not satisfy the real needs of western economic development. There is a large space for developing venture capital market in Sichuan province.

In Sichuan province, the local venture capital agencies do not grow well. Till late 2008, venture capitals from Chinese venture capital agencies are 250.616 billion Yuan RMB, and in the year of 2008 the total are 33.954 billion Yuan RMB. Only 6.62% (about 1 billion Yuan RMB) are from mid and western venture capital agencies, of which 70% have government background. Sichuan province just has two national high-tech zones respectively in Chengdu and Mianyang. And the venture capital agencies are mostly in Chengdu, few in Mianyang. The majority of venture capital agencies centers in Chengdu. There are about a dozen venture capital agencies in Chengdu. However, most venture capital agencies are merely in the name of venture capital but focus on services or traditional investment business (Gongmeng Chen & Xinying Cai, 2009).

Sichuan province is lack of professionals of venture capital. Venture capital professionals are complex talents with the professional knowledge of scientific research, finance, securities, and market, a sense of venture capital and competition, and experiences in capital market. However, local venture capital starts late in Sichuan province and lacks of a strong financial background and experienced investors who know the high- tech industry well. A survey shows that managers in most venture capital agencies are not professional, who may know finance but not high technologies, or know technologies but not finance. Therefore, it is necessary to strengthen talent training, accelerate the pace of continuing education for venture capital talents, and focus on cultivating new professionals of venture capital.

The government encourages the development of venture capital. Since 2009 the government has hold two meetings for "High-Tech and Venture Capital in Western China" and signed dozens of contracts successfully, helping many high-tech enterprises get venture capital. Create the GEM (Growth Enterprise Market) and establish a solid foundation for the exit of venture capital. Venture capital agencies are not afraid of capital "rushing in but not out". One year later, more than 130 enterprises are listed in GEM, and there are six from Sichuan, including Guibao Tech, Gifore, Geeya Technology, Kexin Mechanical and Electrical Equipment, Goldtel Electronic Technology, and Galaxy Magnets, of which five register in Chengdu. These are beautiful prospects for the success of Sichuan venture capital industry.

By analyzing the conditions of Sichuan high-tech industry and venture capital market, we know that Sichuan province has rich high-tech resources and active technological market. The venture capital market develops gradually under the direction of government. However, venture capital does not exert the effect on high-tech enterprises fully in Sichuan province. The combination between them is not close. In the long run, domestic and foreign experiences prove that only when venture capital plays the roll well in high-tech enterprises, can it really promote the local economic growth, achieving fast economic growth. Therefore, the effective integration of venture capital and high-tech enterprises in Sichuan province is the object of current urgent research.

3. The theoretical relation model of venture capital and high-tech enterprise

Venture capital market is the carrier of knowledge capital, industry capital, and financial capital, and the innovative institution for the development of high-tech enterprises. High technologies can not become real productivity unless realizing industrialization. Here, we establish a theoretical model to illustrate the relation of venture capital and high-tech enterprise.

In the model, assume that venture capital is only part of funds needed by enterprise, and the high-tech enterprise has two sources of funds: venture capital and bank loans and the entrepreneur can not borrow loans from banks unless getting venture capital. The loan interest rate r_f is risk-free. The venture capital is high- risk share capital, and the expected yield $r_s > r_f$. The total investment of start-up enterprises is I and the net present value of profits is V_r.

Suppose r with two values. As the enterprise successes, $r = r_g$, $r_g > r_f$, and the probability of success is P. As the enterprise fails, $r = r_b$, $r_b < r_f$, and the probability of failure is $(1-P)$. Meanwhile, the return of a successful enterprise is determined by whether there is an active GEM, ensuring venture capital benefiting from "gold harvest". The return of successful enterprise is the random function of degree of small-company stock market maturity, $r_g = f(S) + \varepsilon$. Here, S is random variable usually reflected by GEM transaction growth rate or changes of return. Because of uncertainty of high-tech enterprise, the value of r is unknown. But venture capitalist can predict its value by his or her knowledge of technology, commerce, and enterprise. If the investment of venture capitalist $I_v < I$, the entrepreneur has to get loans from banks $L = I - I_V$. According to banks' risk-free rate, get $Lr_f \leq Ir_g$. Meanwhile, as venture capitalists buy shares, he or she hopes to maximize the investment. Therefore, the optimal investment is:

$$Min \ (I - I_V)r_f \leq Ir_b \qquad (3.1)$$

From (3.1), get: $I_v^* = (1 - r_b / r_f)I$; $L^* = I - I_V^* = (r_b / r_f)I$

From the optimal solution, we can get the venture capitalist's expected return r_s:

$$r_s = [(1-P)r_b + P \cdot r_g)I - L^* r_f] / I_V^* = P(r_g - r_f)/(1 - r_b / r_f) \qquad (3.2)$$

Suppose there are N start-up enterprises in the society. N_{it} means the new thought from an entrepreneur is presented in industry i during the period of t. When certain enterprise gains success, the return is a random variable. Suppose r_g submit to the following independent index distribution:

$$P_r(r_g \leq x) = 1 - e^{u(x - r_b)}, x \geq r_b \qquad (3.3)$$

As a venture capitalist selects a target from amounts of projects, he or she sets the minimum profitability $\overline{r}$. Then, the critical value of the venture capitalist j is $\overline{r}_j$. Other venture capitalists also have a critical $\overline{r}_{i \neq j}$. The entrepreneur should find out the venture capitalist with lowest critical value in order to get venture capital. Under

the Nash Equilibrium, each venture capitalist will choose $\overline{r}_i = \overline{r}^*$. Plug $\overline{r}^*$ into the equation (3.2), then:

$$r_s = [P(r_g - r_f)/(1 - r_b/r_f)|r_g \geq \overline{r}^*]$$

$$= \frac{u \cdot r_f E(r_g - r_b)}{r_f - r_b} = \frac{u \cdot r_f(\overline{r}^* + u^{-1} - r_b)}{r_f - r_b} \qquad (3.4)$$

Use the equation (3.4) to get the value of $\overline{r}^*$ $\overline{r}^* = \frac{r(r_f - r_b)_s}{r_f \cdot P} - \frac{1}{u} + r_b$ \qquad (3.5)

Then, the probability of one enterprise getting venture capital is:

$$F = P_r(r_g > \overline{r}) = e^{-u(\overline{r}^* - r_b)} = EXP[1 - \frac{u \cdot r_s(r_f - r_b)}{r_f \cdot P}] \qquad (3.6)$$

From the equation (3.4), we know that r_s is the function of r_g. So, in equation (3.6), F is also the function of r_g. For one start-up enterprise, whether getting venture capital is directly associated with the return r_g of enterprise.

Suppose the average size of venture capital is standardized as 1. Suppose there are N_t start-up enterprises applying venture capital during the time period t, then total venture capital $V_t = FN_t$. Suppose α of start-up enterprises with venture capitals produce patents. The number of patents produced by venture capital is αFN_t. Besides venture capital, entrepreneurs can also find other financial sources to fulfill the dreams. Suppose β of start-up enterprises without venture capital produce patents, then the number of patents is $(1 - F)\beta N_t$. So, the total social patents are:

$$P_t = \alpha FN_t + \beta(1 - F)N_t = (\alpha - \beta)FN_t + \beta N_t = kV_t + N'_t \qquad (3.7)$$

In the equation (3.7), P_t are the total patents in the society. V_t is the total venture capital. The coefficient k reflects the effects of venture capital on technological innovation. N'_t is the constant term in the model. The equation (3.7) proves that venture capital exerts higher stimulating effects on technological innovation than others. Venture capital has a special function. Technological innovation can trigger the development of high-tech enterprises. Finally, we can conclude that venture capital has a significant stimulating effect on the development of high-tech enterprises.

4. A case study of venture capital financing of Chengdu Geeya Technology Co.,Ltd.

In Sichuan province, local venture capital industry does combine closely with high-tech industry. But the province does have some high-tech enterprises that are financed by venture capital in development. Next, we make a case study of venture capital financing of Chengdu Geeya Technology Co., Ltd. Use it to illustrate the development of high-tech enterprises caused by venture capital in Sichuan province. The successful case of Chengdu Geeya Technology Co., Ltd. listing on the market offers a possibility of coordinative development of venture capital and high-tech enterprises in Sichuan province.

4.1 Background of Geeya Technology Co., Ltd. financing

Chengdu Geeya Technology Co., Ltd. (hereinafter Geeya for short) is formally known as "Chengdu Geeya High-Tech Co., Ltd. It was established in November 1999 and its annual turnover is nearly two hundred million. Geeya has always followed the world advanced level, adhering to the business philosophy of "trying to be the technological leader and creating the first class brand". By means of introducing and practicing new technologies and self innovation, Geeya Technology acquires abilities of designing and integrating TV terminal and engineering construction, and experiences. The financing process of Geeya Technology is as follow:

The first step is to obtain private equity investments. Geeya Technology has experienced transfers of equities for many times during the operation. Based on the increment of registered capital, Geeya Technology acquired four times of private equity investments, totally valuing 43.1 million Yuan RMB. Qing Lu and other people are very optimistic about the Geeya Technology. They gained a lot from it (See Figure 1).

The second step is to obtain professional venture capital. In the development of Geeya Technology, with the capital increment, the enterprise won professional venture capitals for three times. In June 2007, the first venture capital was from Beijing Zhengdao Jiuding Investment Co., Ltd., Shanghai Fengze Investment Management Co., Ltd., Shanghai Fengrui Investment & Development Co., Ltd., and Hangzhou Dehui Investment Co., Ltd. Those

enterprises offered 19 million RMB to Geeya Technology. In November 2008, the second venture capital was from Changsha Xin'ao Investment Co., Ltd., which offered 5 million RMB. In June 2009, the third venture capital was from Changsha Xin'ao Investment Co., Ltd., Shenzhen Hangyuanfu Investment Co., Ltd., and Hangzhou Jiaze Investment Co., Ltd. They offered 15.9 million RMB. From these professional venture capitals, Geeya Technology obtained 39.9 million RMB totally. All the investments are one-time injections (See Figure 1).

With the assists of venture capital, Geeya Technology has done four tasks quickly: improving organizational structure, internal management mechanism, enterprise incentive distribution mechanism and market promotion plans, classifying and re-organizing the business, focusing on software development, and partially adjusting enterprise's strategic direction. Besides, with the help of venture capitalists, Geeya Technology achieves technological innovation, develop software programming based on existing system integration business, set up branches in Shenzhen, Beijing, and Shanghai, seizing the key areas of market.

The third step is to achieve financing by market listing. In October 2009, Geeya Technology is the first enterprise listing on GEM successfully in the radio and television field. On October 30, 2009 the stock is in trading at the Shenzhen Stock Exchange, raising net capitals of 391.86 million RMB, more than the planned 206.86 million RMB. Listing on GEM and entering the capital market present Geeya Technology a brand-new platform for development, providing financial support for enterprise's sustaining development, playing a positive rule in brand promotion and standard government, and improving enterprise's competitiveness and profitability. In 2009, Geeya Technology realized the business return of 189,748,592.93 RMB, up 20.52% over last year, and total profits 189,748,592.93 Yuan, up 15.76% over last year (http://www.geeya.cn/).

4.2 An analysis of financing operation in Geeya Technology

Geeya Technology has experienced private equity investment, professional venture capital, and finally listing on GEM successfully. Now we make a case study of Geeya Technology financing, hoping to give some clues to high-tech enterprises' venture capital financing.

Joint-investment is one of characteristics of venture capital. For venture capitalists, joint-investment is a way to reduce risks and costs. For entrepreneurs, joint-investment can help to achieve mutual compensations of venture capitalists, guaranteeing the enterprise with better services. Geeya Technology employed the joint- investment in its four venture capitals and three professional venture capitals. By this way, Geeya Technology acquires more cash investments, reducing investment risks for venture capitalists, and benefiting the sustainable development of venture capital.

Venture capital has two ways to exit. For Geeya Technology, one way is equity transfer. For many private equity investors, as non-professional venture capitalists, they can not exactly know the industry or predict the future market. They are eager to get return from investments. So, to transfer equities before listing on market is a good exit. The other way is public listing. It is optimal for monitoring funds and exiting ways. In The United States, about 30% of venture capitals choose to exit from the market by initial public offering. This way can bring about huge economic benefits and social benefits for venture capitalists and entrepreneurs. In the case of Geeya, the second exit of venture capital was the successful public listing in China's GEM in 2009. It gave Geeya a new financing source and also offered a better exit channel and rich benefits for venture capital. Practices prove that the most ideal financing mode for high-tech enterprises is public listing after financing by venture capital. In 2009, Geeya got total profits of 50,317,945.63 RMB, up 15.76% over last year.

By the empirical analysis of Geeya financing by venture capital, we find that during the whole development process, Geeya continuously won venture capital, which supplied financial support for its fast development. And that is also one reason for the success of Geeya. The development of high-tech enterprises needs the support from venture capitals, and the development of venture capital market has to take high-tech industry as the base.

5. Conclusion

In this paper, by introducing the development of venture capital industry and high-tech industry in Sichuan province, authors find that venture capital does not play its role in Sichuan high-tech industry. Sichuan local venture capital industry is still at the initial development stage. The connection between venture capital industry and high-tech industry is not close. By analyzing the theoretical mode of venture capital and high-tech enterprises and the case of Geeya financing, authors conclude that venture capital plays a crucial role in the development of high-tech enterprises. Venture capitals offer a possibility for the fast development of high-tech enterprise. At the same time, venture capitalists obtain huge profits. Therefore, the development of high-tech enterprises should start from venture capital industry, ensuring the "catalyst" effect of venture capital in high-tech enterprises, and promoting the economic development in Sichuan province. This paper merely studies high-tech industry and venture capital

industry in Sichuan province from the angle of present conditions and relations. As for how to develop the two industries and how to coordinate their relationship, it deserves further study. Because of authors' limited capacities, this paper also has some problems. Authors look forward to suggestions and corrections.

References

Cai, Jiming. Wang, Nan. Mo, Xiaomei & Liu, Keran. (2010). Analysis of high-tech industry development in Sichuan. *Soft Science*. No.7.

Chen, Gongmeng & Cai, Xinying. (2009). A research on the regional differences of Chinese venture capital development. *Securities Market Herald*. No.5.

Chen, Weihua. (2000). *Venture capital on high-tech industry --- experiences from American venture capital*. Hebei: Master Theses from Hebei University.

Chengdu Geeya Technology Co.,Ltd. http://www.geeya.cn/

Ding, Jutao. (2002). *Research on technological innovation driving western economic development*. Shaanxi: Doctor Theses from Northwestern University.

Jiang, Tao. Fu, Xinhong & Jiang, Qian. (2008). A co-integration analysis of public finance technology input and independent innovation in Sichuan Province. *Science and Technology Management Research*. No.12. p27-29.

Li, Meng. (2002). *High-tech industry and venture capital*. Beijing: Master Theses from Capital University of Economics and Business.

Ma, Guangqi & Duan, Lizhi. (2010). Empirical analysis of high-tech venture capital development --- a case study of Wenzhou city. Communication of Finance and Accounting. No.8. p8-9.

Mo, Guihai. (2007). Research on function mechanism of venture capital intervention in the high-new-tech industrial clusters up-growth. Science and Technology Management Research. No.1. p56-59.

Science and Technology Department of Sichuan Province. http://www.scst.gov.cn/info/

Sichuan Statistics Information Network. http://www.sc.stats.gov.cn/

Wang, Xuli. (2009). *On the venture financing mode for high-tech enterprises*. Tianjin: Master Theses from Tianjin University of Technology.

Yu, Fugong. (2009). *High-Tech Industrialization and Venture Capital Market*. Beijing: People's Publishing House.

Table 1. The high-tech industrial added value and the contribution to GDP. (100,000,000 Yuan)

Year	GDP	GDP increment	Industrial added value	High-tech industrial added value	Contribution percentage of high-tech industry to GDP	Increment of high-tech industrial added value	Contribution rate to GDP (%)
2006	8637.8	1252.7	3144.7	422.7	4.9	99.8	7.97
2007	10505.3	1867.5	3860.6	627.3	6.0	204.6	10.95
2008	12506.3	2001.0	4939.3	835.8	6.7	508.5	10.42
2009	14151.3	1645.0	5678.3	1241.4	8.8	405.6	24.70

Source: Sichuan Bureau of Statistics, Science and Technology Department of Sichuan Province, Statistical Statement of Sichuan High-Tech Industry in 2009.

Table 2. Sources for R&D expenses in Sichuan province. (10,000 Yuan)

Sources	2003	2004	2005	2006	2007	2008
Government	441331	361701	438399	473458	586403	768660
Enterprises	257502	356951	456173	551310	731824	787050
Foreign sources	5484	3743	3966	1390	1832	3727
Other sources	89895	57672	63912	49501	71071	63171
Total	794211	780066	962450	1075659	1391130	1622607
Proportion of R&D expenses from government (%)	55.57	46.37	45.55	44.02	42.15	47.37

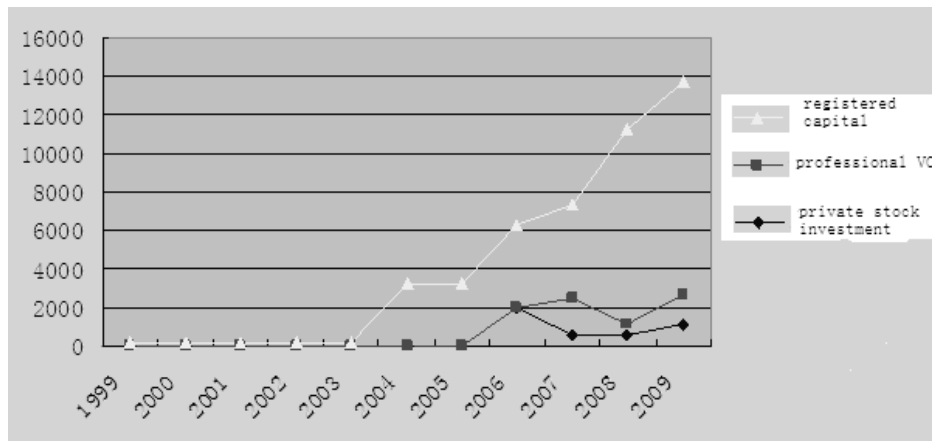Source: Sichuan Statistical Yearbook 2009.

Figure 1. Geeya's Financing by Venture Capital. (Unit: 10,000 RMB)

Earnings Management through Discretionary Expenditures in The U.S., Canada, and Asia

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Abstract

There is a considerable literature on U.S. companies' earnings management through discretionary accruals and real earnings management. We extend this literature to the international setting and include the effects of corporate tax on earnings management decisions.   We find that US based models of earnings management work reasonably well in the Canadian setting, and except for the effects of taxes, in the Hong Kong, Japanese, Korean, and Taiwanese settings as well. We predict that firms' tax status may have a countervailing effect on such management. Consistent with this prediction, we find that firms with larger potential tax savings are more likely to use real earnings management to accelerate discretionary expenditures. Since these discretionary deductions have income-reducing effects for financial reporting purposes, the results suggest that income taxes have a strong incentive effect. However, this tax effect occurs for only U.S. and Canadian firms; Hong Kong, Japanese, Korean, and Taiwanese firms' discretionary accrual decisions appear to not be influenced by taxes. The results may have policy implications for other countries as well.

Keywords: Tax management, Discretionary expenditures, Discretionary accruals

1. Introduction

There is a considerable literature on U.S. companies' earnings management through discretionary accruals and real earnings management. We extend this literature to the international setting and also include the effects of corporate tax on earnings management decisions. Specifically, we examine discretionary spending for research and development (R&D), selling and administrative expenses (SG&A), and advertising. We find that US based models of earnings management work reasonably well in the Canadian setting as well, and except for the influence of taxes, work reasonably well for Hong Kong, Japanese, Korean, and Taiwanese firms as well.

For U.S. and Canadian firms, we find that firms with larger potential tax benefits are more likely to manage taxes through real expenditures management. Since these discretionary deductions have income-reducing expenses for financial reporting purposes, the results suggest that income taxes have a strong incentive effect in these two countries. In contrast, taxes appear to have no influence on Asia firms' discretionary expenditures. The results may have policy implications for other countries as well.

2. Discretionary Real Expenditures

Consider a situation where management decides whether to make additional discretionary real expenditures (DRE) in research and development (R&D) selling, general, and administrative expenses (SG&A), and advertising in period t. The decision is a function of the marginal return to such expenditures, or R (DRE), tax status (T) in t, cash flow constraints (CF), and financial reporting costs (FRC) of potentially missing earnings targets. Financial reporting costs are assumed to be increasing in DRE, or $f(DRE_t)$. Financial reporting costs are also a function of discretionary accruals made first; that is, the firm first makes necessary discretionary accruals (which have no tax

effects in general) to exceed earnings target, there is little cost to making an income-decreasing discretionary accrual. After the firm makes the discretionary accrual decision, the firm decides on discretionary real expenditures.

The manager maximizes profit π by solving spending on DRE in year t:

$$\text{Max } \pi = \quad \max \left[R(DRE_t)(1\text{-}T_t) - f(DRE_t) \right] \tag{1}$$

s.t. $CF \geq \quad DRE_t$

Solving first order conditions, and rearranging:

$$\partial \pi / \partial DRE = R(1\text{-}T_t)/ f. \tag{2}$$

Thus, DRE is an increasing function of R and T, a decreasing function of f, and subject to cash flow considerations. In our data, we cannot observe R, and assume it is constant across firms and time. However, we can proxy for financial reporting costs as follows:

Prediction 1: *Ceteris paribus, firms' discretionary expenditures are lower when larger income-increasing discretionary accruals have been made.*

We can proxy for cash flow considerations by proposing that growth firms can afford to make more discretionary expenditures, as follows:

Prediction 2: *Ceteris paribus, firms' real earnings management through increased expenditures in years when the firm has increased sales and increased cash flows from operations.*

Additionally, following from (2):

Prediction 3: *Ceteris paribus, firms' real earnings management through increased expenditures is higher when marginal tax rates are higher.*

Of course, in the international setting, marginal rates vary by country. For example, we would expect the tax effects to higher in the U.S. with a 35% marginal rate, than in Hong Kong which has a 15% rate (on average).

There is a growing literature on real earnings management through discretionary expenditures, in the absence of tax considerations. The next section discusses that literature.

3. Prior Research

3.1 Real Earnings Management

Firms sometimes deliberately control earnings so that the figures hit a target and give information users "untruthful information". Schipper (1989) defined 'earnings management' as a purposeful intervention in the external financial reporting process, with the intent of obtaining some form of private gain. Healy and Wahlen (1999) note that "earnings management occurs when managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company, or to influence contractual outcomes that depend on reported accounting numbers". In a review of the literature, Dechow and Skinner (2000) note that accruals management involves within-GAAP choices that try to "obscure" or "mask" true economic performance. They also indicate that methods such as acceleration of sales, and delaying of research and development and maintenance expenditures, can be used for earnings management purposes. Nelson et al. (2003) provide evidence how managers manage earnings based on the information obtained from survey of 253 experienced auditors. They afford the proof of earnings management involving revenue recognition, reserves and other accruals, and fixed asset impairment and amortization and so on.

Recently, real earnings management has become of interest to researchers. According to Graham et al.'s survey (2005), managers prefer earnings management using manipulation activities including reduction of discretionary expenditures or capital investments. Baber et al. (1991) and Bushee (1998) show that managers tend to reduce research and development expenditures to hit their earnings targets. Baber et al. find that relative R&D spending is correlated managers' incentives to report positive or increasing income in the current period. Roychowdhury (2006) finds evidence that managers manipulate real activities to avoid reporting annual losses. His findings also show that managers use several real activities manipulation tools such as price discounts to temporarily increase sales, overproduction to report lower cost of goods sold, and reduction of discretionary expenditures for the purpose of improving reported margins.

Gunny (2005) finds that firms will use any one of the real earnings management strategies: reduction of R&D; reduction of SG&A; timing of income recognition from the disposal of long-lived assets and investments; and cutting prices to boost sales(and /or overproducing to decrease COGS expense). Also, he finds that real earnings management negatively affects subsequent operating performance in terms of low future earnings and cash flows.

Zang (2006) reports on the evidence of the tradeoffs between accrual-based earnings management and real earnings management. She finds that firms decide first real earnings management and then accrual manipulation follows. She also provides evidence that both earnings management tools are correlated with the costs of accrual manipulation, and are negatively correlated with each other. Cohen et al. (2008) investigate earnings management across two main time periods-the pre-Sarbannes-Oxley (SOX) period and the post-SOX period. They find that firms are more prone to use real earnings management methods after the passage of SOX. The fact that real earnings management increased significantly after SOX is consistent with the evidence provided by Graham, Harvey, and Rajgopal (2005). They suggest that firms switched to managing earnings through real activities possibly because these methods are less likely to be revealed, although they are more costly.

More recently, Cohen and Zarowin (2008) study earnings management behavior around Seasoned Equity Offerings. They find that firms manage earnings through real activities manipulation as well through accruals and analyzed firms' tendency toward tradeoff real versus accrual-based earnings management activities around SEO's. They also find that the costs of real earnings management are apt to be greater than the costs of accrual-based earnings management, at least in the SEO context. Cohen and Zarowin (2008) also examine the relation between both real and accrual-based earnings management activities and firms' investment behavior. They find that firms managing earnings by either means overinvest in the years up to and including the period of high earnings management, and then underinvest, indicating that each type of earnings management is associated with significant real effects. Moreover, the excess investment associated with real earnings management is at least as great as the excess investment associated with accruals earnings management, and firms that engage in both real and accrual earnings management activities have greater investment effects than firms that engage in either one alone.

For a comprehensive review of the real earnings management literature, the reader is referred to Xu, et al (2007).

3.2 Earnings Management and Tax Avoidance

While earnings management is primarily used to hit an earnings target, it can also be intended to obtain some other form of gain. Firms can trade off tax savings and meet their earnings target for financial reporting purposes by delaying discretionary expenditures. Alternatively, firms can reduce taxes by accelerating discretionary expenditures, but this may have an unfavorable effect if it causes the firm to miss earnings targets. Such dual objectives appear likely when firms determine the level of their book-tax conforming earnings management accounts such as R&D, advertising, and SG&A expenditures.

Lin (2006) reports that firms manage earnings for tax purposes. Examining Chinese firms which were about to lose their tax holiday benefits, i.e., experience a tax increase., Lin finds that in the year immediately before the tax rate increase, firms report discretionary accruals, on average, 1% higher than those in the years after tax rate increase. Badertscher et al. (2006) analyze the tax implications of pretax earnings management. They investigate the firm-specific characteristics that impact the choice between book-tax conforming earnings management and book-tax nonconforming earnings management strategies and find that 'nonconforming earnings management' is more prevalent than 'conforming earnings management'. Finally, Desai and Dharmapala (2006) examine the link between earnings management and corporate tax avoidance by illustrating how tax shelter products to make managers able to manipulate reported earnings.

4. Data and Econometric Specification

Assume that firms make earnings management decisions in the following order. First, they use discretionary accruals, which (because they have no cash flow implications) are considered to be less costly than discretionary expenditures. Next, they decide on discretionary expenditures. From an earnings management perspective, we expect a negative relationship between discretionary accruals and discretionary expenditures.

Our financial data is derived from Compustat Global for all U.S., Canadian, Hong Kong, Korean, Japanese, and Taiwanese firms from 1990-2007. We first estimate each firm's DACC (discretionary accruals), using the Jones model, modified by Kothari et al. (2005). Abnormal accruals are the residuals from modified Jones model regressions including ROA as shown in the following equation:

$$TA_{it} = \alpha_0 + \alpha_1 / ASSETS_{it-1} + \alpha_2 \Delta(SALES_{it}-AR) + \alpha_3 PPE_{it} + \alpha_4 ROA_{it} + \varepsilon_{it} \qquad (3)$$

where:

TA_{it} = as the change in non-cash current assets minus the change in current liabilities excluding the current portion of long-term debt minus depreciation and amortization, deflated by the beginning-of-year total assets;

$ASSETS_{it-1}$ = the total assets at the beginning of fiscal year t;

$\Delta(SALES_{it} - AR_{it})$ = the change in sales, adjusted for the change in accounts receivable from fiscal years t-1 to t,

deflated by the beginning-of-year total assets;

PPE_{it} = the gross property, plant and equipment at the end of fiscal year t, deflated by the beginning-of-year total assets, and

ROA_{it} = income before tax divided by lagged total assets of fiscal year t.

COMPUSTAT Global data items for (3) are shown in Appendix 1.

To develop our proxies for real earnings management, we follow the method used by Roychowdhury (2006). We estimate normal discretionary expenses which include advertising expense, research and development, and SG&A expenses using the following equation:

$$DE_{it} = \beta_0 + \beta_1 /ASSETS_{it-1} + \beta_2 SALES_{it-1}/ ASSETS_{it-1} + \varepsilon_{it} \quad , \quad (4)$$

where:

DE_{it} = the sum of R&D expenses and Selling, General and Administrative expenses, deflated by the beginning-of-year total assets;

$ASSETS_{it-1}$ = the total assets at the beginning of fiscal year t, and

$SALES_{it-1}/ASSETS_{it-1}$ = the sales of fiscal year t-1, deflated by the beginning-of-year total assets.

Compustat data definitions for the above model are shown in Appendix 1. We next estimate abnormal discretionary accruals as actual accruals minus discretionary accruals from (4). Firm *i's* real earnings management (*RM*) via abnormal discretionary expenditures in year *t* can be described as:

$$RM_{i,t} = \alpha + \sum_{t=1}^{n} \alpha_t YR_t + \sum_{j=1}^{n} \beta_j X_j + \delta T_{t,c} + \varepsilon_{i,t} \quad (5)$$

where *YR* is a fixed and estimable effect on real earnings management in any one year (which we later see to be increasing), *X* is a vector of *RM* factors common to all firms including year, industry membership, size (log of total assets and ROA), leverage, the amount of discretionary accruals the firm makes in year *t* estimated from the residuals from (4), and cash flow constraints (change in sales and cash flows). Finally, change in GDP is used to control for country macro effects.

The model includes a tax variable, T, which is the firm's home country *c's* top statutory tax rate for year t. This variable is then multiplied by zero, 0.5, or 1, consistent with prior literature (Shevlin 1990; Graham 1996; Klassen and Mawani 2000; Pittman 2002). This variable is multiplied by zero if the firm has neither (a) current income tax expense nor (b) positive pre-tax income; 0.5 if the firm has either (a) or (b); and 1 if the firm has (a) and (b). Consistent with (2), we predict that increasing levels of this variable in any year will induce additional discretionary expenditures in that year if the tax benefits outweigh the cost to the firm in earnings objectives.

5. Results

5.1 Descriptive Statistics

Means and standard deviations for U.S., Canadian, Hong Kong, Japanese, Korean, and Taiwanese company data used in our subsequent regressions are reported in Table 1. Correlation coefficients for the same data are reported in Table 2. Compustat data definitions are reported in Appendix 1.

[Insert Tables 1 and 2 about here]

5.2 Regression Results

Because of many similarities between US and Canadian companies it is useful to first compare regressions on US based and Canadian based firms. Table 3 shows these regression results.

[Insert Table 3 about here]

Results are similar across the two countries. Model F statistics are all significant at 0.001. The structural variables explaining discretionary expenditures have signs consistent with theory, and are all statistically significant. Firms with higher (lower) leverage seem to be more (less) likely to engage in earnings management using discretionary expenses. The relationship with the change in sales shows a positive relation as we expected; firms with more funds available are unlikely to decrease discretionary expenses. ROA is included to capture profitability; we find that profitable firms appear to have less incentive for earnings management by decreasing discretionary expenses with the predicted sign. Most importantly, we see a significant and negative relationship between discretionary accruals and discretionary expenditures, consistent with predictions. If firms can manage earnings sufficiently with accruals, they have relatively less need to manage earnings through discretionary expenditures.

The coefficient estimates for discretionary accruals are larger for U.S. firms than for Canadian firms. Although both book and tax rules for SG&A and advertising are the same in the U.S. and in Canada (expensing), the accounting rules for R&D differ. While U.S. GAAP requires expensing of R&D, Canada allows for capitalization and subsequent expensing. Thus for R&D, Canadian firms have more opportunities to manage earnings though discretionary expensing or capitalization of R&D.

Across the two countries, the tax variables are significant and consistent with predictions. In years when the firm experiences a higher statutory tax rate, it increases its discretionary expenses in the current year. The results are consistent with (2), and suggest that, after controlling for financial reporting objectives, firms tend to increase discretionary expenditures in higher tax rate years.

Regression results for Hong Kong, Japan, Korea, and Taiwan are shown in Table 4.

[Insert Table 4 about here]

The results (except for the tax rate variable) are similar to those for the U.S. and Canada. Except for Hong Kong companies, there is a significant negative relationship between discretionary accruals and discretionary real expenditures, supporting the conjecture of the substitute nature of the two earnings management techniques. All four countries' firms show significant and positive effects for ROA; as with U.S. and Canadian firms, these firms increase discretionary expenditures in years of higher profitability. Similarly, for all countries, discretionary expenditures increase in years of greater fund availability (increased sales). Unlike their U.S. and Canadian counterparts, East Asian firms do not show any evidence of creasing their discretionary expenditures in high tax rate years. As noted earlier, this was not unexpected for Japan (whose consistently high effective tax rates suggest that firms do not aggressively manage their taxes) and Hong Kong (where marginal rates are low, making some tax planning less important). On the other hand, we have no conjectures as to why tax rates are not significant for Korean and Taiwanese firms.

7. Conclusion

There is a considerable literature on US companies' earnings management through discretionary accruals and real expenditures management. We extend this literature to the international setting and include the effects of corporate tax on earnings management decisions, examining U.S., Canadian, Hong Kong, Japanese, Korean, and Taiwanese firms. We find that U.S. based models of earnings management (of discretionary expenses) work reasonably well in the international setting. We predict that firms' tax status may have a countervailing effect on such management. Consistent with this prediction, we find that U.S. and Canadian firms operating in higher tax rate years are more likely to use real earnings management to accelerate discretionary expenditures. Since these discretionary deductions have income-reducing expenses for financial reporting purposes, the results suggest that income taxes have a strong incentive effect. The results may also have policy implications. If countries raise statutory rates in a year, firms may react by accelerating expenses into that year. Such tax effects are not significant for East Asian firms, a finding for which we can explain only for Japanese and Hong Kong firms.

References

Baber, W., Fairfield, P. M. and Haggard, J. A. (1991). The effect of concern about reported income on discretionary spending decisions: the case of research and development. *The Accounting Review* 66 (4): 818-829.

Badertscher B., J. Phillips, M. Pincus, and S.Rego. (2006). Do Firms Manage Earnings Downward in a Book-Tax Conforming Manner? Working Paper, University of Connecticut, University of California – Irvine, and University of Iowa.

Barton, J. (2001). Does the use of financial derivatives affect earnings management decisions? *The Accounting Review* 76(1): 1-26.

Berger, P. (1993). Explicit and Implicit tax effects of the R&D tax credit. *Journal of Accounting Research* 31 (2): 131-171.

Black, E. L., K. F. Sellers and T. S. Manly. (1998). Earnings management using asset sales: An international study of countries allowing noncurrent asset revaluation. *Journal of Business Finance and Accounting* 25(9/10): 1287-1319.

Bushee, B. (1998). The influence of institutional investors on myopic R&D investment behavior. *The Accounting Review* 73 (3): 305-333.

Cohen, D., A. Dey, and T. Lys. (2008). Real and Accrual Based Earnings Management in the Pre and Post Sarbanes Oxley Periods. *The Accounting Review* 83: 757-787.

Cohen, D. and P. Zarowin. (2008). Accrual-Based and Real Earnings Management Activities around Seasoned Equity Offerings. Working Paper. Stern School of Business, New York University.

Cohen, D. and P. Zarowin. (2008). Economic Consequences of Real and Accrual-Based Earnings Management Activities. Working Paper. Stern School of Business, New York University.

Dechow, P. M. and Skinner, D.J. (2000). Earnings management: Reconciling the views of accounting academics, practitioners, and regulators. *Accounting Horizons* 14 (June): 235-250.

Dechow, P.M., S. P. Kothari, and R. Watts. (1998). The Relation between Earnings and Cash Flows. *Journal of Accounting and Economics* 25: 133-168.

Desai, M., and D. Dharmapala. (2006). Corporate tax avoidance and high-powered incentives. *Journal of Financial Economics* 79: 145-179.

Graham, J. R. (1996). Proxies for the corporate marginal tax rate. *Journal of Financial Economics* 42 (2): 187-221.

Graham, J. R., C. R. Harvey, and S. Rajgopal. (2005). The Economic Implications of Corporate Financial Reporting. *Journal of Accounting and Economics* 40: 3-73.

Gunny, K. (2005). What are the Consequences of Real Earnings Management? Working Paper, University of Colorado.

Healy, P. and J. Wahlen. (1999). A Review of the Earnings Management Literature and its Implications for Standard Setting, *Accounting Horizons*: 365-384.

Huang, T., A. Lenk and A. Szezesny. (2006). Substitution, availability and preferences in earnings management: Empirical evidence from China. Working paper, Shandong Economic University, Johann Wolfgang Goethe University.

Klassen, K. J., and A. Mawani. (2000). The impact of financial and tax reporting incentives on option grants to Canadian CEOs. *Contemporary Accounting Research* 17 (2): 227-62.

Kothari, S. P., A. J. Leone, and C. Wasley. (2005). Performance Matched Discretionary Accrual Measures. *Journal of Accounting and Economics* 39: 163-197.

Lee, N. and C. Swenson. (2007). World-Wide Tax Avoidance. Working Paper, Leventhal School of Accounting, University of Southern California.

Lin, K. Z. (2006). The impact of tax holidays on earnings management: An empirical study of corporate reporting behavior in a developing-economy framework. *The International Journal of Accounting* 41: 63– 175

Lin, S., S. Radhakrishnan and L. N. Su. (2006). Earnings management and guidance for meeting or beating analysts' earnings forecasts. Working paper, California State University at Frenso, University of Texas and Hong Kong Polytechnic University.

Nelson, M. W., J. A. Elliott, and R. L. Tarpley. (2003). How are Earnings Managed? *Accounting Horizons*, Vol. 17(Supplement): 17-35.

Pittman, J. A. (2002). The influence of firm maturation on tax-induced financing and investment decisions. *Journal of the American Taxation Association* 24 (2): 35-59.

Roychowdhury, S. (2006). Earnings Management through Real Activities Manipulation. *Journal of Accounting and Economics 42*: 335-370.

Schipper, K. (1989). Earnings management. *Accounting Horizons* 3: 91-106.

Shevlin, T. J. (1990). Estimating corporate marginal tax rates with asymmetric tax treatment of gains and losses. *Journal of the American Taxation Association* 11 (2): 51-67.

Scholes, M., P. Wilson, and M. Wolfson. (1990). Tax planning, regulatory capital planning, and financial reporting strategy for commercial banks. *The Review of Financial Studies* 3 (4): 625-650.

Swenson, C. (1992). Some tests of the incentive effects of the research and experimentation tax credit. *Journal of Public Economics* 49: 203-218.

Wall Street Journal. (2008). Corporate-Tax Reporting Draws GAO Scrutiny.

Xu, R., Taylor, G., and M. Dugan. (2007). Review of Real Earnings Management Literature. *Journal of Accounting Literature* 26: 195-228.

Zang, A. (2006). Evidence on the Tradeoff between Real Manipulation and Accrual Manipulation. Working Paper, University of Rochester

Notes

Note 1. For example, a recent Wall Street Journal article (Corporate-Tax Reporting Draws GAO Scrutiny by Jesse Drucker, August 13, 2008; Page A2) reported a GAO study which found that 23% of large U.S. corporations, and 70% of foreign corporations doing business in the U.S., do not pay federal income taxes in any given year. The GAO found that most U.S. corporations were wiping out their tax liability without using tax credits or net operating losses -- a mechanism that allows corporations to deduct from their taxable profits the losses generated in previous years. The most commonly used deductions were for salaries and wages and "other deductions."

Note 2. Harris (1993), Guenther (1994), Lopez et al. (1998), Maydew (1997), and Scholes, Wilson, and Wolfson (1990) prove that U.S. publicly held firms manage earnings in response to changes in corporate income tax-rates.

Note 3. Statutory tax rates were derived from Coopers and Lybrand (later, PwC) International Tax Summaries (various years) and from the OECD.

Note 4. Lin et al. (2006) prove that firms simultaneously use a comprehensive set of earnings management tools to meet or beat analyst earnings forecasts. Barton (2001) also demonstrates that firms smooth earnings by manipulating financing activities (financial derivatives) and accruals simultaneously. Meanwhile, it has been proved that managers prefer accruals management to manipulation via real business activities as accruals manipulation is less costly (Black et al. 1998; Huang et al. 2006). Also, real earnings management possibly gives negative impact on firms' future performances and firm value (Graham et al. 2005; Gunny 2005).

Note 5. The total accruals can be obtained by subtracting operating cash flows from net income before extraordinary items and discontinued operations, or alternatively can be estimated as the change in non-cash current assets minus the change in current liabilities excluding the current portion of long-term debt minus depreciation and amortization. Due to limitations using cash flow statement items from Compustat Global, we define total accruals (TA) as the change in non-cash current assets minus the change in current liabilities excluding the current portion of long-term debt minus depreciation and amortization, scaled by lagged total assets.

Note 6. Roychowdhury (2006) generates the normal levels of CFO, discretionary expenses and production costs using the model the model developed by Dechow, Kothari and Watts (1998).

Note 7. With reference to COMPUSTAT Global data items, Disc (Data5+Data52)/lagged Data89; COMPUSTAT Global data does not provide a separate item for advertising expenses; as long as SG&A is available, R&D expenses are set to zero if they are missing.

Note 8. When discretionary expenses are expressed as a function of current sales, significantly lower residuals can occur if firms increase reported earnings by managing sales upwards. Therefore, we model discretionary expenses as a function of lagged sales like Roychowdhury (2006) does.

Note 9. Because of the difficulty in obtaining reliable data, we do not include local taxes (e.g. taxes paid by U.S. firm to individual states).

Note 10. R&D budgets are often based on sales (Berger 1993). Similarly, other prior studies suggest that R&D investment depends on the availability of funds (Erikson and Jacobson 1992).

Note 11. Prior literature constructs a tax status variable that is equal to 1 if the firm has (a) no loss carryforwards and (b) positive pre-tax income; 0.5 if the firm has either (a) or (b); and 0 if the firm has neither (a) nor (b). Since Global Compustat does not report loss carryovers, we use current positive income tax expense as a proxy for absence of loss carryforwards.

Note 12. Absent from our explanatory variable is intangible assets, which can provide tax shields through amortization. Country accounting practices for intangibles vary so widely that inclusion of this variable created highly distortionary effects (which were not statistically significant) on all other variables.

Note 13. Random effects models were also tested, but diagnostics indicated fixed effects models (by year and industry) were a much better fit to the data.

Table 1.Descriptive Statistics

US firms								
Variables	REM	Accruals	RDintensity	Leverage	Δ SALES	ROA	SIZE	STR
Mean	-0.0055	-0.0257	0.3836	0.4856	0.1334	-0.0102	5.8175	0.1510
Median	-0.0107	-0.0266	0.0004	0.4935	0.0910	0.0466	5.7808	0.1750
Std. Deviation	0.0294	0.0126	14.6145	0.2194	0.4086	0.5823	1.8624	0.0592
Q1.	-0.0174	-0.0307	0.0000	0.3128	-0.0023	-0.0057	4.5888	0.1700
Q3.	-0.0012	-0.0216	0.0584	0.6452	0.2217	0.0978	7.0114	0.1750
Canadian firms								
Variables	REM	Accruals	RDintensity	Leverage	Δ SALES	ROA	SIZE	STR
Mean	-0.0146	-0.0191	0.5047	0.4406	0.1829	-0.0229	5.7036	0.1138
Median	-0.0202	-0.0203	0.0000	0.4462	0.1195	0.0282	5.6936	0.1400
Std. Deviation	0.0213	0.0200	12.7697	0.2136	0.5793	0.4777	1.7435	0.0452
Q1.	-0.0227	-0.0268	0.0000	0.2878	-0.0156	-0.0384	4.5704	0.1050
Q3.	-0.0135	-0.0144	0.0042	0.5923	0.3257	0.0804	6.8821	0.1400
Korean firms								
Variables	REM	Accruals	RDintensity	Leverage	Δ SALES	ROA	SIZE	STR
Mean	-0.0173	-0.0248	0.0675	0.5379	-0.2210	0.0497	8.2575	0.1153
Median	-0.0153	-0.0246	0.0031	0.5607	0.0899	0.0367	7.8201	0.1350
Std. Deviation	0.0069	0.0089	1.6492	0.2133	1.5710	0.1028	2.1642	0.0455
Q1.	-0.0215	-0.0289	0.0001	0.3806	-0.0156	0.0068	6.6169	0.1250
Q3.	-0.0153	-0.0206	0.0169	0.6967	0.2161	0.0782	9.5950	0.1350
Japanese firms								
Variables	REM	Accruals	RDintensity	Leverage	Δ SALES	ROA	SIZE	STR
Mean	-0.0235	-0.0241	0.0173	0.5619	-0.1316	0.0150	9.9773	0.1537
Median	-0.0159	-0.0247	0.0027	0.5761	0.0232	0.0163	10.0886	0.1500
Std. Deviation	0.0099	0.0072	0.1748	0.2160	0.6902	0.0849	1.5628	0.0143
Q1.	-0.0190	-0.0289	0.0000	0.4031	-0.0374	0.0021	9.1421	0.1500
Q3.	-0.0113	-0.0198	0.0184	0.7301	0.0888	0.0376	11.0344	0.1500
Taiwanese firms								
Variables	REM	Accruals	RDintensity	Leverage	Δ SALES	ROA	SIZE	STR
Mean	-0.0181	-0.0252	0.0362	0.4604	0.1018	0.0575	8.4892	0.1102
Median	-0.0193	-0.0257	0.0113	0.4671	0.1102	0.0489	8.3697	0.1250
Std. Deviation	0.0050	0.0103	0.2289	0.1739	0.5347	0.1312	1.4356	0.0494
Q1.	-0.0212	-0.0298	0.0000	0.3389	-0.0175	0.0049	7.4075	0.1250
Q3.	-0.0164	-0.0211	0.0348	0.5845	0.2642	0.1054	9.3894	0.1250
HongKong firms								
Variables	REM	Accruals	RDintensity	Leverage	Δ SALES	ROA	SIZE	STR
Mean	-0.0183	-0.0258	0.0070	0.4092	0.0247	0.0517	7..2810	0.0753
Median	-0.0205	-0.0281	0.0000	0.3951	0.0630	0.0304	7.1712	0.0850
Std. Deviation	0.0085	0.0336	0.0781	0.0450	0.6620	0.7499	1.8384	0.0282
Q1.	-0.0226	-0.0372	0.0000	0.2412	-0.1269	-0.0246	6.2284	0.0850
Q3.	-0.0171	-0.0230	0.0000	0.5707	0.2305	0.0810	8.3397	0.0875

Notes:

REM: Abnormal discretionary;

Accruals: Abnormal accruals;

R&D Intensity: Data52/Data1;

Leverage: Total Liabilities/Total Assets= (Data89-Data135)/Data89;

Δ Sales: CSALES = LN(data1)-LN(lag(data1));

ROA: Profitability = pretax income/lagged total assets=Data21/lag(Data89);

SIZE: natural log of total assets(Data89), and

STR: Adjusted Statutory Tax Rate(STR), STR times Tax status. Consistent with prior literature, tax status is computed as 1 if the firm has (a) positive income tax expense and (b) positive pre-tax income; 0.5 if the firm has either (a) or (b); and 0 if the firm has neither (a) nor (b).

Table 2. Correlations between Variables

Canadian firms

	Variables	REM	Accruals	R&D Intensity	Leverage	Δ SALES	ROA	SIZE	STR
US firms	**REM**	1.0000	-0.0268	0.1078*	-0.0738	0.1383*	-0.6060*	-0.2307*	-0.1643*
	Accruals	-0.0779*	1.0000	-0.0229	0.0290*	0.1489*	-0.0678*	0.0878*	0.0424*
	R&D Intensity	0.1139*	-0.0216*	1.0000	-0.0490*	0.1660	-0.0852*	-0.0497*	-0.0994*
	Leverage	-0.1478*	0.1054*	-0.0303*	1.0000	-0.0368*	0.0407*	0.3573*	0.2540*
	Δ SALES	0.2995*	-0.0655*	0.1997*	-0.0920*	1.0000	0.0139	-0.0036	0.0100
	ROA	-0.6020*	0.1234*	-0.1090*	0.0271*	-0.1599*	1.0000	0.2055*	0.3040*
	SIZE	-0.1955*	0.0833*	-0.0302*	0.2983*	-0.0193	0.1180*	1.0000	0.3528*
	STR	-0.1501*	0.0421*	-0.0563*	0.0131*	0.0137*	0.2894*	0.2745*	1.0000

Japanese firms

	Variables	REM	Accruals	R&D Intensity	Leverage	Δ SALES	ROA	SIZE	STR
Korean firms	**REM**	1.0000	-0.1018*	0.0380*	-0.0942*	0.1507*	0.0606*	-0.1467*	-0.0697*
	Accruals	-0.0549*	1.0000	-0.0014	0.1047*	0.1212*	0.0410*	0.1168*	0.0195*
	R&D Intensity	-0.0549*	-0.0071	1.0000	-0.0634*	0.0572*	-0.0288*	-0.0084	-0.0582*
	Leverage	-0.1347*	0.0480	-0.0591*	1.0000	-0.0500*	-0.1735*	0.0701*	0.1139*
	Δ SALES	0.2315*	0.1948*	0.0957*	0.0764*	1.0000	0.0752*	0.2561*	-0.0042
	ROA	0.2498*	-0.0144	-0.0326	-0.2782*	0.1518*	1.0000	0.0387*	0.0412*
	SIZE	0.0550*	0.0652*	-0.0010	0.0135	0.3217*	0.2200*	1.0000	0.0926*
	STR	0.1071*	0.0813*	-0.1228*	-0.0883*	0.1627*	0.4463*	0.1118*	1.0000

Taiwanese firms

	Variables	REM	Accruals	R&D Intensity	Leverage	Δ SALES	ROA	SIZE	STR
Hong-Kong firms	**REM**	1.0000	-0.1005*	0.0793*	-0.0704*	0.1360*	0.2228*	-0.2802*	0.0996*
	Accruals	0.1982*	1.0000	0.0048	-0.0185	0.1206*	0.3253*	0.1055*	0.0027
	R&D Intensity	0.0242	-0.0168	1.0000	-0.0810*	0.1588*	-0.0061	-0.0541*	-0.0631*
	Leverage	0.0457	-0.0371	0.0470	1.0000	-0.0226	-0.3392*	0.2474*	-0.1965*
	Δ SALES	0.0974*	-0.0364	0.1531*	0.1114*	1.0000	0.2977*	0.1663*	0.1343*
	ROA	0.0908*	0.8755*	-0.0237	-0.0859*	-0.0174	1.0000	0.0360*	0.3699*
	SIZE	-0.1791*	-0.0374	-0.0732*	0.1034*	0.0730*	0.0387	1.0000	0.0129
	STR	-0.0260	0.0107	-0.1622*	0.0303	0.0336	0.1359*	0.3631*	1.0000

Notes:

REM: Abnormal discretionary;

Accruals: Abnormal accruals;

IS: {(Data21+Data5+Data52) -lag(Data5+Data52)}/lag(Data89);

R&D Intensity: Data52/Data1;

Leverage: Total Liabilities/Total Assets= (Data89-Data135)/Data89;

Δ Sales: CSALES = LN(data1)-LN(lag(data1));

ROA: Profitability = pretax income/lagged total assets=Data21/lag(Data89);

SIZE: natural log of total assets(Data89);

Ch_GDP: Change in GDP, and

STR: Adjusted Statutory Tax Rate(STR), STR times Tax status. Consistent with prior literature, tax status is computed as 1 if the firm has (a) positive income tax expense and (b) positive pre-tax income; 0.5 if the firm has either (a) or (b); and 0 if the firm has neither (a) nor (b).

*Correlation is significant at the 0.05 level.

Table 3. Factors Affecting Real Earnings Management: Discretionary Expenditures 1990-2007
(*t*- statistics in parentheses, coefficients rounded)

Model: $REM_{i,t} = \alpha_0 + \beta_1 Accruals + \beta_2 RDintensity + \beta_3 Leverage + \beta_4 \Delta Sales + \beta_5 ROA + \beta_6 SIZE + \beta_7 Tax + Year$ Dummies + Industry Dummies + $\varepsilon_{i,t}$

Panel A: US and Canadian Firms

Variable (expected sign)	US	Canada
(Constant)	-0.0061(-4.34)***	-0.0111(-7.68)***
REM Structural Variables		
Accruals (-)	-0.1307(-14.45)***	-0.0491(-3.77)***
R&D Intensity (+)	0.0001(3.60)***	0.0001(1.70)*
Leverage(-)	-0.0095(-19.62)***	-0.0084(-7.90)***
ΔSales (+)	0.0123(48.71)***	0.0055(15.59)***
ROA(?)	-0.0255(-128.28)***	-0.0326(-65.58)***
SIZE(?)	-0.0017(-28.35)***	-0.0014(-10.14)***
Tax Variables		
Tax rate in year t (+)	0.0151(8.27)***	0.0380(6.45)***
Model R^2 (F)	0.4458(991.34)***	0.6055(215.41)***
Year indicators	Yes	Yes
Industry indicators	Yes	Yes
No. of Observations	40,630	4,611

Panel B: Asian Firms

Variable (expected sign)	Korea	Japan	Taiwan	HongKong
(Constant)	-0.0186(-2.77)**	-0.0055(-2.46)**	-0.0158(-3.62)***	-0.0192(-3.26)***
REM Structural Variables				
Accruals (-)	-0.0499(-2.07)**	-0.0524(-5.94)***	-0.0804(-12.31)***	0.1232(6.22)***
R&D Intensity (+)	0.0159(10.02)***	0.0016(5.05)***	0.0013(4.85)***	-0.0006(-0.14)
Leverage(-)	-0.0002(-0.17)	-0.0016(-5.67)***	0.0033(8.17)***	0.0010(0.66)
ΔSales (+)	0.0010(8.06)***	0.0025(29.51)***	0.0010(8.13)***	0.0015(3.22)***
ROA(?)	0.0165(8.83)***	0.0044(6.44)***	0.0105(17.77)***	-0.0038(-4.19)***
SIZE(?)	-0.0002(-2.27)**	-0.0011(-28.05)	-0.0010(-19.44)***	-0.0009(-4.89)***
Tax Variables				
Tax rate in year t (+)	-0.0017(-0.41)	0.0043(0.65)	0.0007(0.43)	0.0098(0.83)
Model R^2 (F)	0.2596(23.09)***	0.1843(175.77)***	0.2391(52.75)***	0.1379(4.56)***
Year indicators	Yes	Yes	Yes	Yes
Industry indicators	Yes	Yes	Yes	Yes
No. of Observations	1,387	25,526	5,106	735

Notes:

*** Significant at 0.01 level

** Significant at 0.05 level

* Significant at 0.1 level

REM: Abnormal discretionary;

Accruals: Abnormal accruals;

R&D Intensity: Data52/Data1;

Leverage: Total Liabilities/Total Assets= (Data89-Data135)/Data89;

Δ Sales: CSALES = LN(data1)-LN(lag(data1));

ROA: Profitability = pretax income/lagged total assets=Data21/lag(Data89);

SIZE: natural log of total assets(Data89); and

STR: Adjusted Statutory Tax Rate(STR), STR times Tax status. Consistent with prior literature, tax status is computed as 1 if the firm has (a) positive income tax expense and (b) positive pre-tax income; 0.5 if the firm has either (a) or (b); and 0 if the firm has neither (a) nor (b).

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