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Investigating the Impact of Lean Management on Innovation in Vietnamese SMEs

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Abstract

Internationalization in society and economy has fostered promptly the production volumes and product diversification due to the complexity in customers' design. Lean management has been known as effective and efficient tools in the management of customer value by reducing cost of the resources necessary to achieve the needs of customers. Today innovation has been considered as driving force of business success in every industry in the context of high competition. The link between lean management and innovation capability has been recently proposed in some literatures, which show that some aspects of lean management may negatively affect and some may positively affect a company's capability to be successful with certain types of innovations. This paper develops a framework to analyze the impact of lean management on innovation capability in Vietnamese small and medium enterprises. Five propositions has been presented and tested in the sample of 122 SMEs engaged in lean management. The findings suggest that due to implementation of lean management the changes of organizational structure and inter-departmental coordination have positive effect and the changes of human resources management and organizational culture have negative effect on the innovation capability.

Keywords: lean management, innovation capability, SMEs

1. Introduction

1.1 Introduce the Problem

Lean management has been currently implemented in Vietnamese SMEs under the support of National Program on "Improving Productivity and Product Quality of Vietnamese Enterprises" since 2010 and Cooperation Program between Vietnam and Japan on improving Vietnamese enterprises' efficiency and quality since 2009. Lean management concentrates on removing any wastes that do not add value to the final product. The enterprises engaged in lean management tend to set up the rules and standardizations throughout entire process to prevent any forms of non value-adding activities.

Today innovation has been considered as the driving force of business success, especially for the SMEs to strongly compete in both domestic and international market. The enterprises not only stress on the group of innovative engineers but also create the flexible environment in which all employees are able to develop and explore creativity aiming at adding values to the enterprises. Setting up the encouraging environment for creativity and innovation needs resources and does not bring about the added value at the present. The enterprises normally do not know whether the innovation could bring about the added values even in future.

By fundamental concepts and objectives, some aspects of the lean management are likely restrict innovation and it makes confusion in the group of innovative employees that applying lean management means all activities that does not add value to the current customers should be discouraged at all. A question is that how can enterprises impulse innovation while maintaining a good level of lean practices.

In this paper, the framework to explore the impacts of lean management on an SMEs' innovation capability are built up and a practical investigation based on that is carried out with the sample of 122 Vietnamese SMEs. Both negative and positive effects to innovation capability of enterprises engaged in lean are approached. The interesting link between lean management and innovation presented is background for proposing the suggestions to achieve balance between successful lean practices and improving innovation capability.

1.2 Literature Review

1.2.1 Lean Management

The philosophy of lean was originated by Toyota in 1950s and first defined in the book published in 1990, *The Machine that Changed the World*, based on the Massachusetts Institute of Technology's study on the automobile. The techniques of eliminating *muda* (waste) and coordinating the flow of parts within the supply chain in the famous Toyota Production System (TPS) were initiated by Taiichi Ohno, a production genius of Toyota Motor Corporation. Two backbones of the TPS include just-in-time system (JIT) in which "parts would only be produced at each previous step to supply the immediate demand of the next step" and Jidoka system in which the problems are identified and traced right in the process and no detective parts would be transferred to the next step (James P. Womack et al., 1990, p.49-69).

The main objective of lean philosophy is increasing the efficiency by improving the flow of the system, applying only value adding time and steps into the organization and eliminating all waste. James P.Womack and Daniel T. Jones (1996) brought the concept of "lean thinking" that is eliminating any things not necessary to production by concentrating on exactly what customers need. There five principles of lean thinking including value, value stream, flow, pull and perfection. (James P.Womack & Daniel T. Jones, 1996, p.306-311)

- Value is defined as "capability provided to customer at the right time at an appropriate price, as defined in each case by the customer".
- Value stream is defined as the set of all the "specific activities required to design, order, and provide a specific product, from the concept to launch, order to delivery, and raw materials into the hands of the customer". There are three types of activities in the value stream including activities that unambiguously create value, activities that create no value but seem to be unavoidable, activities that create no value and are immediately avoidable.
- Flow is defined as the "progressive achievement of tasks along the value stream so that a production proceeds from design to launch, order to delivery and raw material into the hands of customer with no stoppages, scrap or backflows".
- Pull is defined as the "system of cascading production and delivery instructions from downstream to upstream in which nothing is produced by the upstream supplier until the downstream customer signals a need".
- Perfection is defined as the "complete elimination of muda so that all activities along a value stream create value".

Aiming to the objective of lean philosophy, there might be changes in organizational structure, intercommunication, experience and skills of employees, product designing process and culture in SMEs engaged in lean.

In most of publication, it is claimed that creating smooth flow and value stream orients the organizations to be more flexible. A flat and flexible organizational structure allows managers to be closer to the shop floor and shortens feedback time, which results in improving information flow, clarity and speeds up decision making (Drew, McCallum & Roggenhofer, 2004, p.52). The longer an organization has been engaged in implementing or using lean, the more flexible structure it had (Faron A., 2012, p.110). The fewer layer in organizational hierarchy to enable quick response and a high level of horizontal integration to increase knowledge transfer (Nahm et al., 2003, p.282). Lean management will lead to a simplification of tasks and these tasks are performed in a reduced space (Paez, O., et al., 2004, p.293). In order to eliminate non value adding activities and create flow, all employees need to think of simplifying their work by standardizing their work, so that a given task will take the same amount of time every time and also will be done correctly on the first attempt (Womack & Jones, 1996, p.10). *Thus, lean management might goes with the lower level of specialization, higher level of horizontal and fewer layers in organizational hierarchy.*

Smoothing the flow of information is considered as a condition to unstop the value stream and lean production development proposes a "seamless information flow" (McManus, 2004). Breaking inter-departmental barriers within the organization and let information flow both horizontally and vertically to smooth the flow of information has seen as success factor in implementation of lean management (R.P. Mishra & A. Chakraborty, 2014, p.165-167). Multi-functional teams in which the members come from different department of SMEs have been broadly deployed and play important roles in implementing lean (Sanchez, A.M. &Perez, M.P., 2001, p.1433-1451). A fundamental strategy in lean is the bottom-up strategy in which employees are involved in continuous improvement process in discovering the sources of waste so as to discard them (Hann et al., 2012).

Lean management might change the inter-departmental coordination in SMEs, in which information of customer's demand and characteristics is shared and all departments are involved in building up the strategy.

Parker (2003, p.631) found that although the work speed improved in lean practice the stress due to lean job increased, the autonomy and skill utilization of employees decreased. Standardization leads to decreased levels of commitment and less motivation as well as less informal communications. The multi-functionality and high productivity requirements on employees lead to the loss of specialized expertise (H.Chen & R.Taylor, 2009, p.830). *Lean management might change human resource management that the employees face with more stress and have less motivation, autonomy, skill utilization and less informal communication.*

As for the purpose of increasing the efficiency by improving the flow of the system, applying only value adding time and steps into the organization and eliminating all waste in lean management, design for manufacturability and standardization are two main practices in lean design. Design for manufacturability is expected to increase the efficiency and asset utilization by simplifying the design, minimizing the number of product parts and standardizing parts and process. Standardization defines the way product design is to be completed every time with standard procedures, standard materials and standard parts, match new design with existing components and manufacturing methods. (H.Chen & R.Taylor, 2009, p.829-830). Since the lean thinking emphasis on value defined by customers thus product design should base on the customers' requirements and all non-value adding activities in designing should be eliminated. *Lean management might change the process of production design, in which process, material, product parts are standardized, number of product parts is minimized, the product design are compatible with existing manufacturing procedures and processes, all non-value adding activities are eliminated and customers' requirements are followed in designing new product.*

Concentrating on waste identification and elimination as well as organizing all activities around value streams make culture in lean organization differ from the traditionally organized ones (W., Urban, 2015, p.135). Lean concepts promote the reduction of any slack or underutilized design resources, any risks or potential failures that can result in necessary corrections, any variability to achieve product quality at relatively low costs (H.Chen & R.Taylor, 2009, p.829). *Lean management might change the culture of SMEs, in which all attention of both managers and employees are cutting non-necessary resources, minimizing risk and reducing variability in keeping required quality.*

1.2.2 Innovation

Innovation was referred to be the single most important factor to boost the economy. According to Albury (2005, p.52), "successful innovation is the creation and implementation of new processes, products, services and methods of delivery which result in significant improvements in outcomes, efficiency, effectiveness or quality". H.Chen and R.Taylor (2009, p.827) explains "innovation as implementation, institutionalization and commercialization of new and creative ideas".

Various form of innovation has been proposed in literature such as product or process innovation, administrative or technological innovation, radical or incremental innovation, etc. Product innovation is defined as new outputs that are introduced for the benefits of customers meanwhile process innovation is considered as new tools, devices, procedures as well as knowledge in throughput technology that mediate between inputs and out puts (Utterback and Abernathy, 1975, p.641-647). Henderson and Clark (1990, p.12-15) use distinction between component and system knowledge to differentiate four categories of innovation including incremental, modular, architectural and radical innovation. Incremental innovation makes improvements on existing design through improvements in the components. Incremental innovation is the most popular innovation in which gradual improvements in knowledge and materials lead to most products and services being enhanced overtime. Modular innovation uses the architecture and configuration associated with the existing system but employs new components with different design concept. Architectural innovation use the new architecture and configuration of the system as new linkages are instituted meanwhile the components and associated design concepts remain unchanged. Radical innovation is on the top of innovation which "establishes a new dominant design, and hence a new set of core design concepts embodied in components that are linked together in a new architecture". Greve, (2007, p.947) presents two forms of innovation, "incremental innovations, as innovations which advance existing technology, and radical innovations, as innovations which develop new technology".

Studying critical factors affect to innovation capability, G. Chryssochoidis (2003) summarizes the factors affecting product innovations in literature in which linkages between organizational demographic characteristics, organizational structure, commitments of managers and employees, environmental conditions of organization, process of strategy formation and product innovation are presented. Marisa Smith and colleagues (2008, p. 659-660) identifies 9 key factors influence organization ability to manage innovation including technology, innovation process, corporate strategy, organizational structure, organizational culture, employees, resources, knowledge management, management style and leadership. Haryani S. & Gupta V.B. (2016, p.1215-1216) figure out five factors affecting to innovation capability of Indian software firms including technological orientation, inter-departmental coordination, competitors orientation, customer orientation and innovative strategies.

1.2.3 Lean Management and Innovation

Relationship between lean management and innovation has been investigated in some researches with the purposes of proposing suggestions to balance between lean management and innovation, two driving forces for today's business success.

Based on observation of Toyota Production System, Mehri (2006, p. 21-42) reveals that due to waste minimization and standardization, lean design have a negative effect on workers' potential for creativity and innovation. Adding to Mehri (2006), H.Chen & R.Taylor (2009, p829-830) study impact of lean management on innovation capability in term of lean culture, lean design, lean supply chain and human resource management. It is argued that there are negative relationships between those dimensions of lean management and innovation capability. The authors suggest that in order to balance between lean management and innovation, the organizations might choose one of these strategies based on its characteristics and products: outsourcing innovation, establishing an independent innovation center, lean innovation system, innovative product development process.

In evaluating the relationship between lean manufacturing dimensions and radical product innovation in Jordanian pharmaceutical sector, Rima Al Hasan and Zu'bi M.F. Al-Zu'bi (2014, p. 230-258) investigate the impact of 4 factors including continuous improvement, waste minimization, lean job characteristics, employee involvement on radical innovation and find that there is negative relationship between lean job characteristics, employees' involvement and radical innovation.

1.3 Conceptual Framework

Since the knowledge background about innovation of Vietnamese SMEs is still limited, this study simply categorizes the innovation in two types, incremental innovation and radical innovation. The incremental innovation refers to the improvement of product or process with the existing design and system. Radical innovation is understood that there should be the new technology or the new market developed. By linking the changes in organization due to lean management and the critical factors affect to innovation, in the next section we develop a framework that conceptualizes the impact of lean management on organization's innovation.

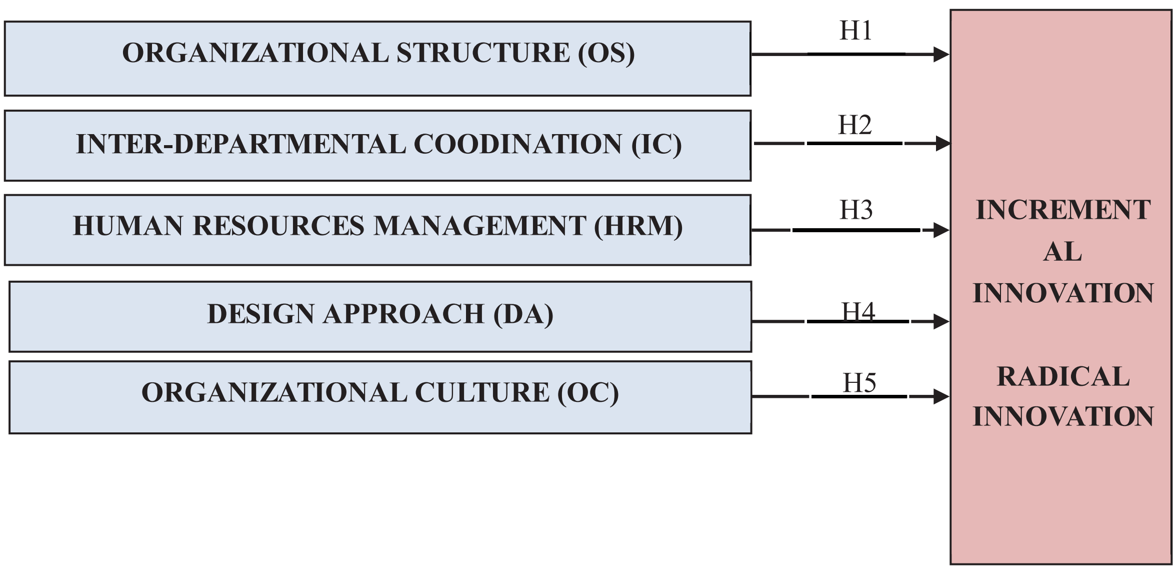

Figure 1. Conceptual Model

As mentioned above, adopting lean philosophy might lead to changes in organizational structure, inter-departmental coordination, human resources management, new product designing process and culture in SMEs engaged in lean. It is presented in previous literature that those might affect to innovation of the organization. Therefore, this study proposes 5 hypotheses on the relationship between lean management and innovation as follows:

H1a. After implementing lean, the changes in organizational structure will result in higher level of incremental innovation.

H1b. After implementing lean, the changes in organizational structure will result in higher level of radical innovation.

Drew, McCallum & Roggenhofer (2004, p.52), Faron A. (2012, p.110), Nahm and colleagues (2003, p.282), Paez, O., and colleagues (2004, p.293), Paez, O., and colleagues (2004, p.293), Womack & Jones (1996, p.10) figure out the impact of lean management on the organizational structrure. G. Chryssochoidis (2003) and Haryani S. & Gupta V.B. (2016, p.1215-1216) identify the effect of organizational structure to the innovation including incremental and radical innovation.

H2a. After implementing lean, the changes in inter-departmental coordination will results in higher level of incremental innovation.

H2b. After implementing lean, the changes in inter-departmental coordination will results in higher level of radical innovation.

Sanchez, A.M. &Perez, M.P. (2001, p.1433-1451), McManus (2004), Hann & colleagues (2012), R.P. Mishra & A. Chakraborty (2014, p.165-167) argue that lean management might change the inter-departmental coordination in SMEs. Haryani S. & Gupta V.B. (2016, p.1215-1216) prove that the higher level of inter-departmental coordination will result in higher level of innovation.

H3a. After implementing lean, the changes in human resource management will result in lower level of incremental innovation.

H3b. After implementing lean, the changes in human resource management will result in lower level of radical innovation.

Parker (2003, p.631) and H.Chen & R.Taylor (2009, p.830) present that lean management might lead to more stress, less motivation, autonomy and skill utilization and less informal communication of employees. Those results might affect to the innovation capability of the organizations.

H4a. After implementing lean, the lean approach of new product design will result in lower level of incremental innovation.

H4b. After implementing lean, the lean approach of new product design will result in lower level of radical innovation.

Marisa Smith and colleagues (2008, p. 659-660), H.Chen & R.Taylor (2009, p829-830) and Mehri (2006, p. 21-42) argue that lean management changes the approach of new product design and this will result in lower level of innovation.

H5a. After implementing lean, the lean organizational culture will result in lower level of incremental innovation.

H5b. After implementing lean, the lean organizational culture will result in lower level of radical innovation.

One of the most critical factors affecting on the implementation of lean management is organizational culture. The organization should change the organizational culture to make it appropriate to the lean philosophy (W., Urban, 2015, p.135), (H.Chen & R.Taylor, 2009, p.829). G. Chryssochoidis (2003), Marisa Smith and colleagues (2008, p. 659-660) identify the organizational culture is a critical factor effecting to the organizations' innovation.

2. Methodology

2.1 Compiling the Questionnaire

To carry out innovation measurements in Vietnamese SMEs as well as the impact of lean management on the organizations, this study develop a data collection questionnaire based on the above literature review and conceptual model. Questionnaire is presented in Vietnamese and composed of 3 main parts including lean implementation, innovation capability and impact of lean implementation on innovation. Based on the analysis of the changes in organizations due to implementation of lean, 19 sub-factors, specifying of 5 factors, are proposed to investigate the affect of lean management to Vietnamese SMEs' innovation. The incremental innovation is measured by assessment on improvement of products and/or process meanwhile radical innovation is measured by assessment on new technology and/or new market developed.

In-depth interview with pilot group of managers was conducted in order to make sure that the managers might understand the content of questionnaires. The terms related to innovation and lean management was edited in Vietnamese to make it easy for SMEs managers understand the content.

Likert 5 points scales, which are strongly disagree, disagree, neutral, agree and strongly agree, are given to measure SMEs' use lean tools, innovation awareness and culture, changes in SMEs after implementing lean management, as well as level of incremental and radical innovation.

2.2 Sampling Selection

In order to investigating the impacts of lean management on Vietnamese SMEs' innovation, this research aimed at 122 companies those joined in the Keieijuku program organized by Vietnam Japan Human Resource Development Institute (VJCC) and funded by JICA from January to July 2017. The reason is that as a main part of Vietnamese SMEs involved in lean management those companies almost get familiar with lean concepts, have at least 3 years of engaging in lean and many of them has been supported in the National Program on "Improving Productivity and Product Quality of Vietnamese Enterprises" and Cooperation Program between Vietnam and Japan on improving Vietnamese enterprises' efficiency and quality since 2009.

The questionnaire was completed by the company executive managers responsible for the whole companies. 250 questionnaires were sent out directly to SMEs, 122 responses were received.

3. Findings

3.1 Reliability

Cronbach's alpha of all measures except INCREMENTAL are greater than 0.7 which is close to one and Corrected Item-Total Correlation is greater than 0.3, which means that all measurements except INCREMENTAL are reliable (Field, 2011).

Table 1. Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Cronbach's Alpha = 0.883 for "Organizational Structure" - OS				
OS1	7.43	1.785	.763	.857
OS2	7.24	2.133	.817	.806
OS3	7.28	2.087	.763	.844
Cronbach's Alpha = 0.769 for "Inter-departmental Coodination" - IC				
IC1	7.80	2.230	.434	.857
IC2	7.90	1.280	.784	.459
IC3	7.84	2.066	.661	.650
Cronbach's Alpha = 0.713 for "Human Resource Management" - HRM				
HRM1	6.57	1.585	0.696	0.42
HRM2	6.53	1.507	0.53	0.645
HRM3	6.61	2.156	0.408	0.759
Cronbach's Alpha = 0.853 for "Design Approach" - DA				
DA1	15.05	7.981	.656	.825
DA2	15.29	7.727	.717	.811
DA3	15.15	6.606	.786	.788
DA4	14.93	8.152	.712	.817
DA5	15.46	7.589	.525	.868
Cronbach's Alpha = 0.744 for "Organizational Culture" - OC				
OC1	7.80	.887	.611	.628
OC2	7.55	1.175	0750	.515
OC3	7.52	1.244	.426	.820
Cronbach's Alpha = 0.297 for "Incremental Innovation" - INCREMENTAL				
INCREMENTAL 1	3.97	.379	.178	
INCREMENTAL 2	3.49	.566	.178	
Cronbach's Alpha = 0.985 for "Radical Innovation" – RADICAL				
RADICAL 1	3.81	0.551	0.971	.
RADICAL 2	3.84	0.529	0.971	.

3.2 Hypotheses Testing

In order to examine the study's hypotheses, multiple regression analysis is conducted. Since measurements of incremental innovation are not reliable so that the regression analysis related to INCREMENTAL would not be carried out.

Table 2. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,644[a]	.415	.390	.56979

a. Predictors: (Constant), OS, IC, HRM, DA, OC

Table 3. ANOVAa

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	26.725	5	5.345	16.464	,000[b]
	Residual	37.660	116	.325		
	Total	64.385	121			

a. Dependent Variable: RADICAL

b. Predictors: (Constant), OS, IC, HRM, DA, OC

The coefficient of the determination (R square) in radical innovation testing is equal to 0.415 which means the 41.5% of variance of the change in radical innovation can be explained by lean affected factors. In the ANOVA analysis, F = 16.464 and Sig. = 0.000 presents that all independent variables in the regression model have the effect to the dependent variable. This gives it to the appropriation of the research model.

Table 4. Coefficientsa

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.915	.468		6.226	.000
	OS	.528	.126	.448	4.204	.000
	IC	.645	.146	.437	4.426	.000
	HRM	-.589	.127	-.555	-4.637	.000
	DA	.234	.118	.217	1.976	.051
	OC	-.513	.102	-.454	-5.051	.000

a. Dependent Variable: RADICAL

H1b. After implementing lean, the changes in organizational structure will result in higher level of radical innovation.

As for the organizational structure, the value of t-test is significant at 95% confidence level (0.000 < 0.05) which means that there is evidence to conclude that the changes of organizational structure due to lean management results in the higher level of radical innovation. The positive beta value (.528) means that the radical innovation increases by 52.8% as the organizational structure flexibility increases (positive relationship).

H2b. After implementing lean, the change in inter-departmental coordination will results in higher level of radical innovation.

The change in inter-departmental coordination got significant result in relationship with radical innovation, the value of t-test is significant at 95% confidence level (0.000< 0.05). The beta value is 0.645 which means that there is significant positive relationship between inter-departmental coordination and radical innovation in Vietnamese SMEs. The radical innovation rises by 64.5% as the inter-departmental coordination goes up.

H3b. After implementing lean, the changes in human resource management will result in lower level of radical innovation.

Furthermore, for the human resource management, the t-test value is also significant at 95% confidence level (0.000 < 0.05), with negative beta co-efficient (-0.589), which mean that there is evidence to conclude that there is negative relationship between the radical innovation and human resource management, when the employees face with more stress and have less motivation, autonomy, skill utilization and less informal communication due to lean, the radical innovation might be restricted.

H4b. After implementing lean, the lean approach of new product design will result in lower level of radical innovation.

On the other hand, for lean approach of new product design, the value of the t-test ***is not*** significant at 95% confidence level (0.051 > 0.05), which means that the variance in radical innovation is not predicted by the lean approach of new product design. In other word, either with transforming to lean design approach or not, radical innovation might not be affected.

H5b. After implementing lean, the lean organizational culture will result in lower level of radical innovation.

Finally, for the organizational culture, the t-test value is significant at 95% confidence level, which means that there is enough evidence to conclude that there is a relationship between lean organizational culture and radical innovation. The beta co-efficient value is 0.513, which means that there is negative relationship and the radical innovation might reduce by 51.3% when the enterprises are engaged deeper in to lean.

4. Discussion and Conclusion

Regarding to our study aim, it was confirmed that the framework to explore the impacts of lean management on Vietnamese SMEs' innovation capability is appropriate. The practical investigation of 122 Vietnamese SMEs presents that the more SMEs engaging in lean, the more flexible oganizational structure and the higher inter-departemental coodination they are, which result in the higher level of radical innovation. However, when transform deeper into lean, the lean job and lean culture make the negative effect to the radical innovation.

The results show that lean management goes with the lower level of specialization, higher level of horizontal and fewer layers in organizational hierarchy. The flexible organizational structure due to engaging in lean makes it possible to have more radical innovation. This reflects the previous studies including G. Chryssochoidis (2003) and Haryani S. & Gupta V.B. (2016).

Again the study proves the argument of Sanchez, A.M. &Perez, M.P. (2001), McManus (2004), Hann & colleagues (2012), R.P. Mishra & A. Chakraborty (2014) about the impact of lean management on the inter-departmental coordination in SMEs. The investigation shows the same result to the research of Haryani S. & Gupta V.B. (2016) that the higher level of inter-departmental coordination will result in higher level of innovation.

Similar to H.Chen & R.Taylor (2009), the study figures out the negative relationship between human resource management, organizational structure and innovation capability. Transforming into lean, the employees get more stress, less motivation, autonomy and skill utilization and less informal communication, thus to lower level of the innovation capability of the organizations. It got the same result as for the lean culture. Lean management might change the culture of SMEs, in which all attention of both managers and employees are cutting non-necessary resources, minimizing risk and reducing variability in keeping required quality. This leads to the negative effect to radical innovation of SMEs.

The relationship between the lean approach of new product design and radical innovation is not significant in the study. It might be the reason that the innovation has been currently emphasized in Vietnamese business community and SMEs invested more in the research and development. Therefore, the lean approach of new product design might not have significant effect to the radical innovation.

The study has linked the changes in organization due to lean management and the critical factors affect to innovation. The interesting link between lean management and innovation is background for proposing the suggestions to achieve balance between successful lean practices and improving innovation capability. The job characteristics such as employees' stress, motivation, autonomy and skill utilization as well as informal communication should be considered significantly when the SMEs get more in lean management.

The limitation of the study is that the results of factor analysis does not give the converge values and the measurements of incremental innovation are not reliable enough. Although the sample size of 122 SMEs might not be large enough to have better result of factor analysis, the framework has been built up based on the results of previous empirical researches and it is supposed that 17 items produce 5 factors investigated above.

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Practical Application of Theory in Business

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Abstract

Theorists spend countless hours conducting research to explain phenomena that exist in the world and to increase the base of knowledge in their fields. Once this knowledge is discovered and codified, it should be used. However, scholars are divided on the relationship between theory and practical application and their reciprocal value. This paper explores the relationship between theory and practical application and displays a specific example of how one theory, the theory of service-dominant logic, can be practically applied in the field of business.

Keywords: theory, practical application, business research, service dominant logic

1. Introduction

What is the purpose of acquiring knowledge if the knowledge is not used? Many believe that the ultimate benefit of knowledge is using the knowledge to some good end. The business world is focused on obtaining tangible, measurable results, often measured by items such as revenue growth, profit increase, and expense reduction.

The desire for practical application is very strong in the business world, and theory is often viewed as not having significant value (Wacker, 2009). However, knowledge gained from theory and theory development can be used to enhance business practice (Thomas, 2017b). This paper explores the relationship between theory and application in business research by using an increasingly popular theory in the fields of business and marketing, the theory of service-dominant (S-D) logic, and by reviewing several examples of the theory's application.

2. Methodology of Literature Review

This literature review was conducted in accordance with the recommended principles of a systematic literature review (Jesson, Matheson, & Lacey, 2011):

1. Field-mapping by means of scoping review
2. Searching comprehensively
3. Extraction of data
4. Synthesis of data
5. Writing-up findings and discussion

A research plan was developed utilizing research questions, keywords, and sets of inclusion and exclusion criteria. The goal of the project was to examine how theory is defined, used, and created in scholarly literature. The research questions included the following:

1. What is the relationship between theory and application?
2. How is theory viewed in business?
3. How does theory contribute to practice?

Keywords were used to conduct searches for relevant peer-reviewed literature and other academic sources. Sources for research included online libraries and databases such as Proquest and GoogleScholar, as well as general Internet searches. After all relevant data were gathered and analyzed, findings were summarized.

3. Presentation of Findings—Literature Review

3.1 Views on the Relationship between Theory and Application

Theory is defined as a group of related generalizations that indicate new observations, which can be empirically tested for the purpose of explaining or predicting (Kaplan, 1964). Practice (application) is the use of knowledge for the purpose of accomplishing work, in essence to do or perform (Martin, 2004; Posner, 2009). These two concepts can be complementary, but can at times seem at odds (Thomas, 2017a; Van De Ven, 2006). There is strong debate in the literature about whether focus on theory strengthens application or weakens it (or vice versa); scholars have many divided opinions (Thomas, 2017b).

Theories provide methods for describing relationships and can be used to predict outcomes or behaviors and problem-solving (Stam, 2007). Problem-solving and goal attainment are often the aims of practice, which is concerned with accomplishing work. Thus, theories can act as knowledge-based tools for performing work (Argyris, 1996). Likewise, observations from application-based fieldwork can be used to generate theory (Schultz & Hatch, 2005).

A continuum exists for views on the relationship between theory and practice (Thomas, 2017b; Van De Ven, 2006). On one end, proponents emphasize practice; on the other, proponents emphasize academic theory. Lewin (1946) was an early advocate for practical theory. His quip, "Nothing is as practical as good theory" (Lewin, 1954, p. 129), can be found in many research papers. Researchers with this point of view often call for actionable knowledge, which is defined as knowledge to implement relevance or external validity in real-world situations (Argyris, 1996). These scholars attempt to influence both groups of stakeholders by providing tools of practical application by the means of theory and urge researchers to move into practical action (Argyris, 1996).

Other researchers advocate a different approach, reversing the relationship examining practices to formulate theory (Schultz & Hatch, 2005). This process is similar to the manner in which theory can be created from observations made from research (Gay & Weaver, 2011). For example, studies of entrepreneurial marketing efforts often show that tactics used by successful entrepreneurs are not explained by theory (Ardley, 2011). These observations could be gathered and analyzed to potentially develop new theory.

Views on the relationship between theory and practice can also vary by field and discipline (Thomas, 2017b). In psychology, scholars cite overemphasis on theory as a potentially damaging practice (Gelso, 2006; Stam, 2007). In marketing, the opposite point of view is seen. Researchers criticize overemphasis on application as being detrimental to theory development and call for building a stronger theoretical base (Ardley, 2011; Burton, 2005). For leadership studies, Posner (2009) suggested that academics encourage the performance of leadership tasks in the classroom rather than merely espousing theory to enhance practical application of leadership theory. In professional fields, workers are often criticized for a lack of awareness of current research or sufficient efforts to translate theory into practice (Weick, 2001).

As previously discussed, theory and research have a complementary relationship and are linked (Fawcett & Downs, 1986; Thomas, 2017b). Researchers can provide observations of phenomena that can be used to create, validate, and refine theory (Gelso, 2006; Thomas, 2017a). Application has a similar relationship to theory, but provides a different perspective. Whereas research is conducted in sanitary environments, application occurs in the real world where environmental factors are often variable (Posner, 2009). The results of application produce real work and accomplishments, which can influence stakeholders to support (fund) academic work to create theory or conduct research (Shultz & Hatch, 2005). While orientations toward theory and application can seem at odds, they should be viewed as complementary rather than mutually exclusive or competitive. Often, inquiries to build academic knowledge result in unsuspected value for application (Merton, 1963), and practice can result in observations that can be used to formulate academic theory (Shultz & Hatch, 2005).

3.2 How a Theory Can Guide Application

Theory guides application by providing methods to solve problems and accomplish work (Stam, 2007). Indeed, many scholars call for theory to be focused on application (Argyris, 1996; Lewin, 1945, 1946; Posner, 2009; Stam, 2007). For example, in the field of management, theory has greatly influenced practice. Often, scholars in management cite successful application as validation of theory (Miner, 1984).

During the late 19th and early 20th centuries, the field of management became formalized with significant contribution from theory. This growth was needed as the Industrial Revolution strained current work systems and managers and as executives struggled to contend with the boom in business. Taylor's (1911) early views of management as a process and calls to approach management scientifically inspired others who built on engineering-like approaches and acknowledged the potential impact on large organizations (Gilbreth, 1911).

Mintzbert (1971) defined the role of managers in directing organizations to achieve goals in a rational manner as being informational, interpersonal, and decisional roles.

These theories were published, socialized, and tested for application in the real world, and they were adopted and put into standard practice over time. As newer theories are produced due to observations from research and practice, the cycle repeats itself. Observations or thoughts generate new theories, and new trends evolve in practice. As an example of this cycle, management science evolved from time and motion studies performed by engineers. Later, these ideas were refined by input from social scientists with experiments such as the Hawthorne Studies and behavioral approaches. These efforts yielded more quantitative approaches to determine optimum methods for operating firms, such as total quality management (Gabor, 1990). Today, scholars debate ideas such as stakeholder theory (Mainardes & Raposo, 2011) and learning organizations (Purhaghshenas & Esmatnia, 2012).

Though the relationship between theory and application can vary by field and stakeholder influences such as funding entities (Ardley, 2011; Burton, 2005; Gelso, 2006; Shultz & Hatch, 2005; Stam, 2007), theory and application have a reciprocal relationship (Martin, 2004). Theory can provide innovative ideas to be used and tested in application. Application can provide observations and experiences to generate new theory. However, theory provides a formal channel for the development and dissemination of new ideas and methods for practice.

3.3 Issues in Translating Theory into Practice

Theory and application are complementary (Martin, 2004), but are often perceived to be in conflict (Ardley, 2011; Burton, 2005; Gelso, 2006; Martin, 2004; Posner, 2009; Shultz & Hatch, 2005; Stam, 2007; Van De Ven & Johnson, 2006). This tension between theory and practice is often referred to as the gap between theory and practice, which many scholars across many disciplines have examined.

Van De Ven and Johnson (2006) asserted that, in many professional disciplines, there is a growing gap between theory and practice and that academic knowledge may have become less than useful in solving practical problems. Several scholars in fields such as psychology (Gelso, 2006; Stam, 2006), management accounting (Baldvinsdottir & Nørreklit, 2010), and marketing (Ardley, 2011; Burton, 2005) hold this view that theory does not support practice. Scholars have cited several issues that create this effect. In some cases, theory has become aggrandized and more like philosophy, making it difficult to measure and apply in practice (Gelso, 2006). In other cases, researchers believe that since the field is an established social science, there is less need to generate applicable theory (Baldvinsdottir & Nørreklit, 2010). Yet others assert that overemphasis on application causes scholars to neglect theory to such a degree that when practical successes are examined, they are not reflective of theory (Ardley, 2011; Burton, 2005).

Another issue with translating theory into practice is environmental factors. Theory is often sound and reasonable, but frequently, the challenge of application is underestimated (Posner, 2009). Whereas theories are generally developed in thought or static environments, practice happens in real-world environments (Posner, 2009). Researchers regularly use a reductionist approach and seek to eliminate many variables to isolate a specific effect. Consequently, there are many variables and influences that can happen in practice that may not be predicted in theory or experienced in research. Additionally, practice occurs in existing systems, and expectations in the system can generate both restrictions and incentives that can affect interactions and the philosophy toward theory creation and use (Argyris, 1996).

Van De Ven and Johnson (2006) found three approaches to framing the gap between theory and practice. The first views the issue as a problem of knowledge transfer. Essentially, knowledge produced by theory is not presented in a form that can be easily applied in practice. Further, researchers expend little effort in working with practitioners to interpret and implement such knowledge (Agyris & Schön, 1996). The second is an argument that practice and theory are two separate kinds of knowledge. Advocates of this view argue that the label of "practical" is not a status to be earned by certain types of academic ideas, but as a whole class of knowledge (Van De Ven & Johnson, 2006). The third point of view argues that the gap is a knowledge production problem arising from critical assessment of professional relevance in practice-based social sciences (Huff, 2000; Madan, 2001). Scholars espousing this viewpoint have called for a revamp of research practice, stating that academic process should be executed with the understanding that there is an applied nature to many social sciences (Huff, 2000; Starkey & Madan, 2001; Van De Ven & Johnson, 2006).

Several issues affect the translation of theory into practice. Theorists may not see the need to align with application (Baldvinsdottir & Nørreklit, 2010). Practitioners may not see the value of theory or stay up to date on current theory (Weick, 2001). Environmental factors in the field can make theory more difficult to implement in practice (Posner, 2009). Practice and theory may simply be two separate types of knowledge (Van De Ven &

Johnson, 2006), and researchers may need to keep an application focus in mind (Huff, 2000; Starkey & Madan, 2001; Van De Ven & Johnson, 2006). Regardless the point of view or discipline, there seems to be an inherent separation of researchers and practitioners that should be dissolved if this issue or gap is to be addressed (Schultz and Hatch, 2005).

3.4 Description of Service-Dominant Logic Theory

Historically, marketing theory was grounded in an economics-based product exchange model emphasizing the production of tangible goods (Aitken, 2006; Vargo & Lusch, 2004b, 2006). Original product-based theories emerged as a result of the tremendous industrial growth of the 20th century, where the mass production of goods reached an incredible level of efficiency (Vargo & Lusch, 2006). S-D logic theory is an alternative approach to the standard goods-dominant (G-D) logic for describing exchange in the marketplace, asserting that all value exchanged in the market is service-based (Aitken, 2006; Karpen, Bove, & Lukas, 2012; Vargo & Lusch, 2004a, 2006).

Looking through an S-D logic lens, one sees a world where markets, organizations, and society are essentially focused on exchange of service—the application of knowledge and skills (competency) for the benefit of an entity (Vargo & Lusch, 2004a, 2006). Service is exchanged for service. Consequently, all firms become service firms, all markets are focused on service exchange, all economies are based on service, and service is the basis of all societies (Vargo & Lusch, 2004a, 2006).

In Westminster, Vargo and Lusch (2004a, p. 7) presented a revised version of the foundational premises of S-D logic theory, expanding the original eight premises to 10:

1. Service is the fundamental basis of exchange.
2. Indirect exchange masks the fundamental basis of exchange.
3. Goods are a distribution mechanism for service provision.
4. Operant resources are the fundamental source of competitive advantage.
5. All economies are service economies.
6. The customer is always the cocreator of value.
7. The enterprise cannot deliver value, but only offer value propositions.
8. A service-centered view is inherently customer-oriented and relational.
9. All social and economic actors are resource integrators.
10. Value is always uniquely and phenomenologically determined by the beneficiary.

In addition to the foundational premises, a few key terms should be defined to better explain S-D logic. Operant resources are resources that act upon other resources to create effect or benefit (Vargo & Lusch, 2004a). An example of an operant resource would be an individual's skills or knowledge. Operand resources are those that must be acted on to be yield benefit (Vargo & Lusch, 2004a). An example of an operand resource would be a natural resource such as wood. If one were trapped in the mountains with a guide and had to stay through a cold night, the guide's skill to make fire would be an operant resource, and the wood gathered to burn would be an operand resource.

S-D logic makes a strong distinction between service and services (Vargo & Lusch, 2004a). Service indicates a process, and services indicates the intangible output. Service is defined as the process of one actor's resource to benefit another actor. Services are the benefits received by the customer. In general, service is used as an action, and services is used as an object.

Goods are viewed as appliances that transmit the value of operant resources (Vargo & Lusch, 2004a). For example, a jar of peanut butter provides the service of storage for the peanut butter and potential nutrition for the consumer. The jar is not perceived as a good, but is viewed as an appliance by which the user can cocreate value with the peanut butter jar provider.

S-D logic provides new realizations about the roles that key components of the market and economy play in commerce. Key tenants of S-D logic are that all value is derived from services and that service providers and consumers are cocreators of value (Vargo & Lusch, 2004a). This becomes more apparent as one examines increasing value added from products that have large amounts of intellectual property and interaction built into them, such as YouTube, Amazon, and Facebook, where users actively add content, such as reviews, pictures, and videos, to the systems that can be read and viewed by other consumers who derive value from the user-created content.

S-D logic is a relatively new marketing theory. Though the preceding description is an accurate account of the current version of the theory, great interest has been stirred in scholars, and S-D logic is the subject of debate in peer-reviewed viewpoint articles (Lusch & Vargo, 2011). Moreover, the theory is being refined through scholarly discourse (Grönroos, 2008; Heinonen, et al., 2010; Heinonen, Strandvik, & Päivi, 2013).

One trend in this discussion is a reductionist focus on value creation (Grönroos, 2008; Vargo & Lusch, 2008). Another point of view is that customers are value creators during consumption of service, and firms are cocreators of value (Grönroos, 2008). Others have stated that value may not be seen as units of output, but as an experience the customer receives (Heinonen et al., 2013). Refinement of this element of S-D logic has evolved as an extension of the customer-dominant (C-D) logic theory (Heinonen et al., 2010, 2013). C-D logic states that S-D logic is actually a provider-dominant logic approach (Heinonen et al., 2010, 2013). Others have suggested examining the dynamics of value proposition itself (Kowalkaowski, 2011). S-D logic theory is evolving in real time and has generated strong discourse in a field criticized for its lack of theory development (Ardley, 2011).

3.5 Application of Service-Dominant Logic Theory

S-D logic theory provides a new view of marketing and is undergoing lively discussion in the field of marketing (Ardley, 2011). As scholarly discourse is used to examine the theoretical concepts and viewpoints of S-D logic (Heinonen et al., 2010, 2013; Kowalkaowski, 2011), other scholars are working to examine how S-D logic can be applied in the field. The five studies following represent scholars' attempts to understand how S-D logic might be applied in real-world situations.

Hansen (2009) used the historical method to examine the evolution of buyer-supplier relationships from an adversarial stance to a service-centered approach. The researcher conducted a review of Walmart over a 5-year period. Changes in policy with both business-to-business and business-to-consumer relationships were examined using a mixed-method approach. Then, empirically reviewed business reports and qualitative interviews with suppliers, managers, and executives were conducted. Hansen concluded that several innovations indicated by S-D logic applied by Walmart coincided with measured success and were adopted by as many as 60,000 of Walmart's suppliers, contributing to the validation of S-D logic theory.

Hansen (2009) seems to have had a strong grasp of S-D logic and applied S-D logic theory appropriately to the study. Most of the premises of S-D logic were examined and applied directly to the study data, identifying both subjective and objective measures. The application of this study aligned with S-D logic claims.

Hilton, Little, and Marandi (2013) studied the effects of adopting self-service technologies (SSTs) for businesses through the application of S-D logic. Hilton et al. (2013) examined 24 semistructured qualitative interviews focused on the daily experience of consumers aged 18 to 65+ using SSTs. Using reductionist methods, three key S-D logic themes were examined. The researchers concluded that while SSTs may provide cost savings and efficiency, S-D logic views indicated that customers could view firms as shifting workload from the firm to the customers if incorrectly implemented and therefore provided recommendations for improving SST customer experiences.

The researchers appear to have had a strong understanding of S-D logic concepts (Hilton et al., 2013). The application of S-D logic theory seems appropriate. However, the reductionist method applied in the study was not used to examine all of the S-D logic concepts and may not be reflective of the theory from a holistic point of view. Further, the researchers may have highlighted a challenge to a core S-D logic concept. The fourth premise of S-D logic indicates that operant resources (human knowledge and skills) are the primary source of competitive advantage (Vargo & Lusch, 2004a). One might argue that SSTs stand in contrast to that precept. SSTs are capable of providing complex interactive services, eliminating human exchange. This shows that there could be a potential need to better define operand resources or to consider additional categories of resources. For example, one might argue for a category of resource such as intelligent operand resources for devices specifically made to deliver multiple levels of service value or that are embedded with intelligence. Thus, this study may have implications that reach beyond the current concept of the theory.

Fitzpatrick, Davey, Muller, and Howard (2013) conducted a study of the intellectual capital (IC) disclosures of the 20 largest European and United States hotels with IC discussions in their 2009 annual reports. Through a robust literature review, Fitzpatrick et al. (2013) asserted that IC is a critical component of competitive advantage in the tourism industry and suggested that traditional empirical methods used to analyze such marketing assets are insufficient and one-dimensional. The S-D logic framework was applied to the analysis to ascertain if S-D logic might be an appropriate tool to address this issue. Using methods adapted from Guthrie and Petty (2001), a coding framework was adapted to classify and identify IC disclosures. The researchers compared the coded IC disclosures to the S-D logic framework and concluded that the S-D logic framework is a more effective instrument for examining the dynamics of IC disclosure than traditional instruments such as tripartite schemes. The researchers asserted that S-D logic provides a more in-depth lens for exploring such phenomena by examining more dimensions of the issue, such as relationships with partners, value creation, and knowledge management systems, as opposed to traditional views, which are only used to examine a single business process (Fitzpatrick et al., 2013).

Fitzpatrick et al. (2013) seem to have grasped the concepts of S-D logic theory soundly and applied the framework comprehensively to the data. Their assertion that S-D logic is a more holistic tool seems valid. However, they did not necessarily provide overwhelming validity of the S-D logic approach, as correlation was not demonstrated between application of S-D logic concepts and success. For example, the researchers might have tried to demonstrate the validity of S-D logic concepts used by the hotels by attempting to show correlation with success criteria, such as revenue generation or profitability.

Ng, Maull, and Yip (2009) studied two outcome-based contracts for defense entities in the United Kingdom’s Ministry of Defence (one missile contract and one jet fighter contract) to gain a better understanding of the provision of service for maintenance, repair, and overhaul environments where customers pay for performance rather than for use of equipment. The researchers used qualitative methods and triangulation, including interviews, observation, and document analysis. Interviews were conducted with 32 stakeholders from both the government entity and the vendor. It was discovered that, in this arrangement, behaviors for both government workers and vendor employees changed in accordance with their new interests. Government employees were less likely to misuse equipment, and vendor employees were more likely to proactively ensure that equipment functioned properly and was taken care of. The researchers determined that outcome-based contracts are a good method for moving from G-D logic to S-D logic services. However, for this to be effective, both parties need to be fully engaged and committed to the process and must guard again redundant process and cost (Ng et al., 2009).

Ng et al. (2009) appear to have had a good understanding of S-D logic theory and applied it appropriately to the study. They sought to understand the value of both parties in the relationship as cocreators of value and commented significantly on the value of people-based skills (operant resources). The work was within the bounds of S-D logic theory, and the conclusions were reasonable, as potential deficiencies in the situation were also identified (Ng et al., 2009). However, they did not compare value received from non-outcome-based contracts, so it would be difficult to conclude their relative value as compared to traditional methods and contracts.

Peñaloza and Mish (2011) examined the applicability of S-D logic theory and consumer culture creation theory on the cocreation of value for stakeholders, as well as the interrelation of the two theories’ concepts. The researchers reviewed an extended case study of nine firms with commitments to social, environmental, and economic stability issues. These firms addressed these issues by giving them the same prominence in business performance as profitability and financial performance. Each firm in the study was selected based on long-term commitments to these concepts (15+ years). Qualitative interviews were conducted with key executives from each firm, generating 1,100 pages of transcripts and reports on the firms. The researchers found that market cocreation varies by firm and its interpretation of value. Additionally, different stakeholders have differing conceptions of the value of each item, which can create confusion. The researchers suggested a potential flaw in the S-D logic premise that all value is in service exchange, which may be challenged when combined with a view of value in use (Peñaloza & Mish, 2011).

Peñaloza and Mish (2011) appear to have had a solid understanding of S-D logic concepts. The researchers went beyond the scope of applying S-D logic theory by looking specifically at market cocreation and comparing S-D logic concepts to consumer cocreation theory concepts. The reductionist application of limited components of S-D theory seems reasonable in isolation, but when viewed holistically, may show flaws. It is difficult to measure value in a system where stakeholders and competitors do not agree on the perception of value and its measurement. Accordingly, the researchers seem to have looked at perceptions (Peñaloza & Mish, 2011), which may not be aligned and would be difficult to derive value beyond the understanding that, in these specific systems, there is potential for differing perceptions of value.

Each of the researchers of these five studies attempted to validate or examine the application of S-D logic theory by means of case study and/or historical review. These methods seem appropriate given the newness, qualitative nature, and robust scholarly discourse of S-D logic theory (Ardley, 2011, Heinonen et al., 2013; Kowalkaowski, 2011). As the theory is currently being refined by both discourse and research, scholars are testing the bounds of its concepts. It will be interesting to observe if practitioners fully embrace the theory so that it can be fully examined in the field.

4. Discussion

The term theory is widely used across disciplines (Gelso, 2006; Stam, 2007). Inconsistent use within and across disciplines creates confusion around the definition of theory. The broad nature of theory may cause researchers to confuse theorizing with theory (Weick, 1995). Evidence of this inconsistency is the existence of articles discussing theory from the perspective of what theory is not, rather than trying to define theory, such as Sutton and Staw (1995) and Weick (1995).

In addition to world views, researchers have more tactical views on what constitutes good theory. Concerns seem to stem from the questions of quality and applicability of theory. Stam (2007) asserted that theory should focus on practice and outcome. Gelso (2006) emphasized that theory must go beyond mere explanation and delve into why variables relate and influence each other, a critical step to adding scientific value. Wacker (1999) called for theory to provide answers to the common questions faced by researchers.

Views and use of theory and research vary by field. Gelso (2006) criticized the use of theories in psychology as large theoretical systems, such as behaviorism, psychoanalysis, and humanism. Gelso asserted that these systems often are combined with personality theories to create a theoretical concoction of untestable life philosophies, statements of faith, and grand theories. Stam (2007) offered a possible explanation for the lack of rigor in psychological theory, suggesting that the term theory is used in an overly broad manner and that researchers may not abandon older theoretical concepts early enough. Consequently, Creswell (2009) and Gelso supported minitheories, parts of these broader systems that are theoretical statements, as effective methods for interpreting specific behavior for psychological research.

Whereas psychology researchers seem to condemn theory for obscuring practice (Gelso, 2006; Stam, 2007, 2010), business researchers, specifically marketing researchers, cite an overemphasis on practical application as potentially damaging theory development (Ardley, 2011; Burton, 2005). Marketing grand theory consistently fails to provide adequate insight into real-world marketing problems (Ardley, 2011). Often, research on successful entrepreneurial ventures indicates marketing techniques that are not based on current marketing theory (Ardley, 2011).

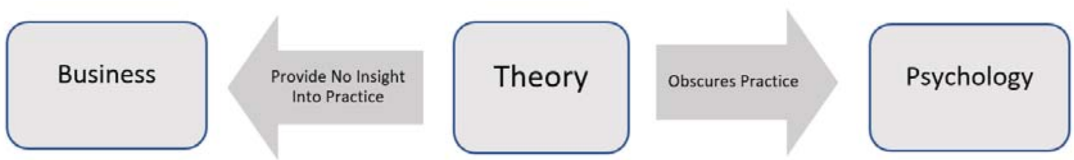

Figure 1. The broad range of views on theory versus practical application by fields

Several views are offered as the reason for poor theory development. Business and marketing researchers do not have time for theory development (Burton, 2005). Theory may be seen as a “second-class citizen” and may not be viewed as useful for stakeholders in business (Wacker, 2009). Researchers may grow weary due to the iterative nature of theorizing and could accept results too early in the process to create a robust theory (Weick, 1995). Alternatively, the lack of agreement on what constitutes theory could inhibit the ability of researchers to identify and agree on definitions of good theory within disciplinary groups.

Older, more established paradigms proffer core guidance for key research and theoretical concepts. Instrumentalism provides guidance for discovery, realism provides guidance for theory validation, and reductionism provides guidance for exploration (Cacioppo, Semin, & Berntson, 2004). Instrumentalists provide theoretical orientation where sound theories are the tools for discovery (Davies, 2008). Realists provide theoretical orientation where existing theories can be validated (Ramoglue, 2013). Reductionists provide theoretical orientation where additional observations can be made when exploring phenomena (Burgelman, 2011; Link, 2000; Wood & Caldas, 2011). Even amid controversy, concepts such as reductionism and grounded theory can be used to create valuable contributions to several disciplines.

Research and theory are inextricably linked (Fawcett & Downs, 1986). The process of retroduction enables theory and research work through a reciprocating cycle to generate scientific discovery (Harlow, 2009). Research is used to generate observations that can be applied to create theory. Theory is then utilized to create the opportunity for additional research, which can be used to validate, refine, or refute theory. This creates a self-reinforcing cycle of discovery that drives the development of new knowledge.

5. Conclusion

Theory and research are far-reaching concepts that are interrelated. Scholars may disagree on the nature and use of theory and research, especially across disciplines, but all seem to respect the importance of the cycle. As researchers gain new knowledge and adapt new methods, older and even controversial theory and research methods often continue to be used to significantly contribute to their fields. Theory provides a method of predicting the interactions of phenomena, and research enables the testing of theory and the discovery of new observations. This interrelationship between theory and research becomes, in effect, an engine to help produce new knowledge.

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The Impact of Surplus Free Cash Flow, Corporate Governance and Firm Size on Earnings Predictability in Companies Listed in Tehran Stock Exchange

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Abstract

Among the most important cases considered in financial statements by investors and other users of financial statements is earnings-related information. Given the need of the users of financial statements for the future information of companies and use of past data to predict the future, it seems that earnings forecast is among the favorite items of investors. In fact, earnings forecast by the management provides information about the future of companies. The main objective of the present study is to investigate the effect of surplus free cash flow, corporate governance and firm size on earnings predictability in companies listed in Tehran Stock Exchange. This research is an applied study and of post-event causal type. For data analysis, OLS regression method has been applied using Eviews software. The research results demonstrate that there is a statistically significant relationship between earnings predictability and surplus free cash flow and good corporate mechanisms play a positive role in the relationship between surplus free cash flow and earnings predictability. According to the results, in large companies, good corporate mechanisms enhance the relationship between surplus free cash flow and earnings predictability.

Keywords: surplus free cash flow, corporate governance, firm size and earnings predictability

1. Introduction

Earning is among the important information of financial statements that attracts the attention of investors and other users of financial statements. Provided information of the company including earnings-related information is based on the past events while users of financial statements need information on the company's future (Haqiqat & Mo'tamed, 2011). One of the factors that should be considered in earnings forecast is earnings volatility. Sometimes, to avoid high earnings volatility, earnings smoothing is performed by managers. One of the incentives for earnings smoothing is the existence of volatile earnings (Badrinath et al., 1989). Since the earnings forecast is of utmost importance, managers pay careful attention to it. There are numerous resources and tools to enhance the accuracy of earnings forecast for managers, which will be more favorable if they lead to close-to-reality forecasts. Further, earnings forecast helps investors improve their decision-making process and reduce the risk of incorrect decisions. Investors are interested in estimating the future benefits of their investment so that they can judge on receiving the future dividend and also the value of their shares (Mashayekhi & Shahrokhi, 2007). According to the research background, corporate governance mechanisms have an impact on the quality of information provided by the company, including the information on earnings forecast.

Different factors may affect earnings predictability. One of these factors is corporate governance (Ahmed & Ismail, 2014). Generally, companies with poor corporate governance which are not under pressure financially tend to make more investment and faster consume the reserves of accumulated funds. Managers who are poorly controlled certainly prefer to use the funds for education and investment in other companies instead of domestic investment through capital expenditure and research and development. Evidence shows that investment for the company's education and capital expenditures and research and development in the companies with poor corporate governance decreases future profitability and corporate value (Izadiniya & Resaeiyan, 2010). Based on the foregoing, the present study has examined the influence of surplus free cash flow, corporate governance and firm size on earnings predictability in companies listed in Tehran Stock Exchange for a 5-year period from 2010 to 2014.

2. Theoretical Foundations

One of the purposes of accounting and preparing financial statements is to provide useful information to facilitate decision-making. One effect of this usefulness is the ability to predict financial statement items. Accounting earnings forecast as a factor influencing economic decisions has long been interested by the users (Haqiqat & Mo'tamed, 2011). Various factors can make an impact on earnings predictability. One of these factors is corporate governance (Ahmed & Ismail, 2014). By definition, corporate governance includes rules and regulations, structures, processes, cultures and systems that cause to achieve the objectives of accountability, guiding transparency performance, justice and respect for the rights of stakeholders (Hassas Yeganeh & Baghoumiyan, 2006). In other words, corporate governance explains a structure through which the goals of the company are specified, methods to achieve the goals are determined and finally, monitoring standards and mechanisms are identified. In this respect, many fundamental reforms have been carried out in companies in order to make sure that different components of corporate governance have been effectively implemented in the company (Germain et al., 2014).

Corporate governance is a system through which business companies are monitored and controlled. Indeed, corporate governance determines the distribution of rights and responsibilities among the various partners in the company, including the board of directors, shareholders and other stakeholders and specifies the rules and procedures for making decisions in corporate affairs. By doing so, structures are provided through which the company's goals are explained and the tool to achieve these objectives and monitoring the performance are also provided. In recent years, corporate governance has assumed great importance. In fact, corporate governance in business organizations has become an important factor for success and also increasing the quality of financial reporting of the company (Ebrahim & Fattah, 2015). Although corporate governance features play different roles to ensure the success of companies, ultimately it is only the role of accountability that affects the commercial economy (Vakili-fard & Bavandpour, 2010).

Van den Berg (2001) states that corporate governance is one of the important elements influencing different dimensions of the company. According to the studies conducted, if companies work to improve and promote the status of corporate governance, this can have a positive effect on various components of the company including performance, corporate value, earnings predictability and so on (Ahmed & Ismail, 2014). Besides, another factor that can affect earnings predictability is free cash flow. Free cash flow is a yardstick to measure the performance of companies and shows the cash flow that the company has at its disposal after spending the necessary expenditures for the maintenance or development of assets.

Free cash flow is important in that it allows the company to search for opportunities that increase the shareholder value. Without having cash, developing new products, doing business education, paying cash dividends to shareholders and reducing debts are not possible. But sometimes, managers are placed in situations in which their decisions are not to the benefit of shareholders of the company and distort the financial reports. Indeed, earnings management occurs when managers enter their judgment in financial reporting and recording the financial reports in a way that modification of the content of financial reports misleads some shareholders in relation to the company's economic performance. Considering what has been mentioned, the main purpose in this study is to investigate the impact of free cash flow, corporate governance and firm size on earnings predictability in companies listed in Tehran Stock Exchange.

3. Research Background and Hypothesis Development

In their study, Aqaei and Chalaki (2009) assessed the relationship between corporate governance features and earnings management in companies listed in Tehran Stock Exchange. They came to the conclusion that a significant negative relationship exists between the components of institutional ownership and board independence with earnings management. Additionally, there is no significant relationship between CEO influence, CEO duality, board size and CEO tenure with earnings management.

Hoshi (2009) evaluated the effect of addressing future financial information in Section 3401 of Auditing Standards on the quality of earnings forecast. The results of this research indicate that implementing this section of Auditing Standards does not cause a reduction in prediction error and a change in the stock price. The literature review suggests that necessary studies on the relationship between management earnings forecast error and accruals have not been considered yet in Iran and in most of the studies performed, the relationship between prediction error and various factors has been tested.

Setayesh et al. (2010) in a research examined the impact of corporate governance on earnings smoothing in companies listed in Tehran Stock Exchange. They concluded that the percentage of non-executive board members affects earnings smoothing, but board independence has no effect on it. Izadiniya and Resaeiyan (2010) investigated the relationship between corporate governance monitoring tools, level of cash holdings and value of 129 companies listed in Tehran Stock Exchange during the years 1999-1999. The obtained results revealed that there is a significant positive relationship between the percentage of institutional investors and level of cash holdings with firm value. But no significant relationship was observed between the percentage of non-executive board members and firm value.

Sabz Alipour et al. (2012) examined the relationship between corporate governance mechanisms and earnings forecast accuracy in 31 companies listed in Tehran Stock Exchange during the years 2005-2010. The results suggest that there is a significant positive relationship only between the percentage of non-executive board members and earnings forecast accuracy and no significant relationship exists between other corporate governance components and earnings forecast accuracy.

Ola et al. (2014) in a study evaluated the relationship between the elements of corporate governance and economic added value during the period 2006-2009. Their findings indicated that among the five elements of corporate governance, only the variable of the percentage of institutional investor ownership has a significant positive impact on economic added value. Moreover, the causal relationship between this variable and economic added value is confirmed based on Granger causality test.

Coles et al. (2001) assessed the relationship between corporate governance mechanisms and earnings forecast accuracy. By selecting 144 American companies, they concluded that companies employing more non-executive members in the board of directors have better forecast accuracy compared to the companies with greater number of executive members in the board. Dechow and Dichev (2002) studied the relationship between firm size and earnings volatility with earnings predictability. By examining the mechanism of the relationship between volatility and earnings predictability, they considered this relationship as the result of accounting and economic factors. The results of this research demonstrated that earnings volatility has a negative relationship with earnings predictability in the short and long terms. Further, firm size has a negative relationship with earnings predictability.

Pham et al. (2007) conducted a study entitled "Corporate governance, capital cost and performance" and investigated a large number of Australian companies during the years 1994-2003. The achieved findings showed that change in corporate governance mechanisms plays a crucial role in explaining the variations in the capital cost of companies. Also, they found that higher percentage of managerial ownership, presence of institutional owners and smaller and more independent board can reduce information asymmetry and risk. This causes the shareholders to demand a lower rate of return and consequently, capital cost of the company decreases. They revealed that corporate governance plays an important role in value creation for shareholders.

Adinehzadeh and Jaffar (2013) examined the relationship between corporate governance and free cash flow in 200 companies listed in Malaysia Stock Exchange. The results suggested that there is a significant positive relationship between the degree of audit committee independence, size and appropriateness of audit committee with the level of free cash flow.

Ahmed and Ismail (2014) studied the effect of surplus free cash flow, corporate governance and firm size on earnings predictability in Malaysia Stock Exchange. They considered the components of board independence, board size, independence of Chairman of the Board, institutional owners and managerial owners as a representative for corporate governance and tested the hypotheses using multivariate regression analysis. The results obtained from this study indicated that companies with high surplus free cash flow have less earnings predictability. Additionally, earning of the companies with high surplus cash flow had more predictability when institutional investors (owners) had more stock and Chairman of the Board was independent. Finally, this research demonstrated that the institutional and managerial role of owners in reducing the conflict of representation of free cash flow and improving earnings predictability in larger firms is very tangible and important. The results of this study indicate that investors still show the necessary prudence in expressing the amount of earning in relation to the ability of the board.

Chang et al. (2015) carried out a study entitled "Corporate governance, product market competition and capital structure" and investigated the relationship between corporate governance and capital structure. In this research, they considered product market competition as a moderator variable in the relationship between corporate governance and capital structure. Their findings showed that when a company with poor corporate governance is present in an industry with high competitiveness, it has greater incentive to maximize the wealth of its shareholders and this leads to faster adjustment of capital structure.

In order to investigate the impact of surplus free cash flow, corporate governance and firm size on earnings predictability in companies listed in Tehran Stock Exchange and considering the theoretical foundations, the research hypotheses are as follows:

Surplus free cash flow makes a significant negative impact on earnings forecast ability.

Good corporate mechanisms (small board, ratio of proportionate outside directors, high institutional ownership and high managerial ownership) as an intermediary have a significant positive impact on the relationship between surplus free cash flow and earnings forecast.

The positive effect of governance mechanisms on the relationship between surplus free cash flow and earnings forecast is more prominent in larger companies.

4. Research Methodology

4.1 Empirical Model

To test the above hypotheses, the following operational models have been designed. To examine whether the SFCF agency problem deteriorates the predictive ability of earnings, we extend the future operating cash flows-current earnings relationship by adding SFCF to the relation. To control for firm characteristics, we include firm size, debt,

and loss in the model. To ensure that the moderating effect captures only the interactive effect of governance variables and SFCF, we also include board independence, board size, board leadership, institutional ownership, and managerial ownership in the model as control variables. This study interacts SFCF, firm characteristics, and governance variables with current earnings to test the incremental effect of the variables on the relationship between one-year-ahead operating cash flows and current earnings. Finally, a dummy year variable is included in the model to capture the fixed year effect. The following pooled cross-sectional model is used to test H1:

$$CFO_{it+1} = \beta_0 + \beta_1 EARN + \beta_2 EARN * SFCF + \beta_{3-7} EARN * CG + \beta_8 EARN + SIZE + \beta_9 EARN * DEBT + \beta_{10} EARN * LOSS + \beta_{11} YR + \varepsilon \quad (1)$$

In model 1, $\mathrm{CFO}_{\mathrm{it+1}}$ is cash flow from operations for firm i at year t+1 scaled by beginning total assets. EARN is net income before extraordinary items for firm i at fiscal year t, scaled by beginning total assets. SFCF is a binary variable with value of 1 if free cash flow (FCF, see Model 3) is above the sample median for the year and the growth ratio (market to book value of equity ratio, MBR) is below the sample median for the year, and 0 otherwise.

In addition, we compute a three-way interaction between current earnings, governance practices, and SFCF to examine the moderating effect of CG on the association between IJAIM 22,2 122 SFCF and earnings predictability. Apart from the current earnings-SFCF interaction, we expect the estimated coefficients on the three-way interaction variables to be significantly related to one-year-ahead operating cash flows in the predicted direction. The predicted

and significant association implies that firms with high SFCF, strong board structure (higher proportion of outside directors on the board, smaller board size, and independent chairman), and effective ownership structure (higher institutional ownership and high shareholding by executives) report predictable earnings. We use the following pooled cross-sectional model to test H2:

$$CFO_{it+1} = \beta_0 + \beta_1 EARN + \beta_2 EARN * SFCF + \beta_{3-7} EARN * CG + \beta_{8-12} EARN * CG * SFCF + \beta_{13} EARN * SIZE + \beta_{14} EARN * DEBT + \beta_{15} EARN * LOSS + \beta_{16} YR + \varepsilon \quad (2)$$

We measure the SFCF agency problem by using operational definitions of the FCF and growth prospects (MBR) of a firm. Firms with a high FCF but low growth opportunities are viewed as firms with a SFCF agency problem (Bukit and Iskandar, 2009; Chung et al. 2005; Rahman and Mohd-Saleh, 2008). Following the literature, Free cash flow (FCF) is calculated as follows:

$$FCF_{i,t} = (INC_{it} - TAX_{it} - INTEXP_{it} - OSDIV_{it} - PSDIV_{it})/TA_{it-1} \quad (3)$$

In the formula of 3, INC defined as Operating income of I firm in t year, TAX, Corporate income tax, INTEXP is Gross interest expense of short-term and long-term debts and OSDIV, Company's total common stock dividend.

4.2 Variables Measurement

Independent variable: In the present research, independent variables include surplus free cash flow, corporate governance and firm size. Surplus cash flow in this study is a dummy variable which will be 1 if there is surplus free cash flow in the company. Otherwise, it is equal to zero. In this research, corporate governance is measured through its components, i.e. board size, ratio of proportionate outside directors, the amount of institutional ownership and the amount of managerial ownership. Firm size in the present research is one of the independent variables and is measured through the natural logarithm of total assets.

Dependent variable: In this study, the dependent variable is earnings predictability. Lip (1990) has explained the concept of earnings predictability based on the variance of statistical distribution of earning of each company.

Following prior studies, a number of control variables are used in the regression models to control for potential influences between variables (Aldhamari and Ismail, 2013). The variables used include firm size, debt ratio and loss. The definitions of variables and their expected signs are summarized in Table 1.

Table 1. Definition of Variables

Variables	Definition
CFO	Operating cash flow
EARN	Net income before the deduction of costs
SFCF	Surplus free cash flow
CG	Corporate governance
Size	Firm size (natural logarithm of total assets)
DEBT	Long-term debt to total assets ratio
LOSS	A dummy variable taking the value of 1 if companies sustaining a loss and 0 otherwise

4.3 Statistical Population and Sample Selection

The research statistical population consists of all the companies listed in Tehran Stock Exchange. In this study, a sample of companies listed in Tehran Stock Exchange is examined during a 5-year period including the financial statements of 2010 to 2014. The statistical sample has been selected through systematic removal method and companies which met all the following conditions have chosen as the statistical sample:

Table 2. Definition of Variables

Criteria for selection	Number of companies
All companies	567
They should not be among holding and investment companies.	478
Banks are excluded due to the special nature of their activities.	385
They should not have a change in the fiscal year or a stop in their operations during the period under study.	266
Their required information should be available for conducting the research.	221
The end of their fiscal year should be on March 19 (Esfand 29).	184
They should have entered the stock exchange before the year 2008.	109

5. Empirical Results and Analysis

5.1 Descriptive Statistics

Table 3 is the summary of descriptive statistics of the 545 observations

Table 3. Summary of Descriptive Statistics

Variable	Signs	Number of observations	Mean	Median	Standard deviation	Maximum	Minimum
Earnings predictability (future operating cash flow)	CFO	545	0.198	0.156	0.320	0.814	-0.189
Firm size	SIZE	545	5.381	5.452	0.739	7.233	3.368
Surplus free cash flow	SFCF	545	0.185	0	0.720	1	0
Corporate governance							
Proportionate outside directors	BDIND	545	0.716	0.67	0.360	0.79	0.19
Board size	BDSIZE	545	4.988	4	0.398	7	4
Managerial owners	MOWN	545	0.750	0.80	0.336	0.961	0.433
Institutional owners	IOWN	545	0.293	0.244	0.436	0.891	0.080

5.2 First Hypothesis Testing

To select one of the methods of panel data or integrated data, F-Limer statistics is used. In other words, F-Limer test statistic determines whether or not there is a separate intercept for each of the companies. In F-Limer test, the null hypothesis indicates the similarity of intercepts (integrated data) and the opposite hypothesis suggests the dissimilarity of intercepts (panel data). Thus, in case of rejecting the null hypothesis, panel data method is accepted.

Table 4. F-Limer test

Effects Test	Statistic	d.f	Prob
Cross- section F	5.561	(88.779)	0.000
Cross- section Chi- square	426.591	88	0.000

Given the results of the table 4, the probability value of F statistic is equal to 0.0000. So, the null hypothesis is rejected and panel data is considered to be appropriate.

If the null hypothesis is rejected after F-Limer test, this question arises as to in the form of which method (fixed effects or random effects) the relationship can be investigated. Hausman test clarifies this issue. The null hypothesis (random effects method) in this test means that there is no relationship between the error term related to the intercept and explanatory variables and they are independent of each other whereas the opposite hypothesis (fixed effects method) means that there is a correlation between the intended error term and explanatory variable. In case of rejecting the null hypothesis, fixed effects method is used. Otherwise, random effects method is applied.

Table 4. Hausman test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f	Prob
Cross- section F	36.939	7	0.000

With regard to the results of the table above, the null hypothesis (random effects method) is rejected at the confidence level of 95 and regression will be estimated through fixed effects method.

Table 4. Estimation of model 1

Variable	Coefficient		Std. Error	t-Statistic	Prob.
β_0	-0.033		0.007	-4.414	0.000
EARN	0.010		0.008	1.252	0.220
EARN*SFCF	-0.002		0.001	-2.123	0.034
EARN*CG	0.001		0.000	2.287	0.028
EARN*SIZE	0.002		0.001	1.785	0.044
EARN*DEBT	-6.960		9.590	-0.726	0.468
EARN*LOSS	-1.150		1.430	-0.798	0.424
YR	-4.200		2.220	-1.894	0.051
	R-squared	0.200	Mean dependent var		0.018
	Adjusted R-squared	0.103	S.D. dependent var		0.374
	S.E. of regression	0.354	Sum squared resid		98.020
	F-statistic	2.058	Durbin-Watson stat		1.965
	Prob(F-statistic)	0.000			

According to model 1 whose information has been provided in Table 4 and with regard to the significance level obtained, there is a statistically significant relationship between earnings predictability and interactive relationship of surplus free cash flow. The amount of Student's t statistic obtained for this relationship is equal to 2.1233 and the relationship is inverse. Durbin-Watson statistic is 1.96 which indicates the absence of autocorrelation. Considering the probability of F statistic, the total regression model is also significant at the confidence level of 95. Thus, the first research hypothesis cannot be rejected at the confidence level of 95.

5.3 Second Hypothesis Testing

Considering the results of the table 5, the probability value of F statistic is equal to 0.0000. Hence, the null hypothesis is rejected and panel data is identified to be appropriate.

Table 5. F-Limer test

Effects Test	Statistic	d.f	Prob
Cross- section F	5.756	(88,779)	0.000
Cross- section Chi- square	438.319	88	0.000

To determine the preferred model from among fixed and random effects models, Hausman test is used which will be provided in the following.

Table 6. Hausman test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f	Prob
Cross- section F	14.592	7	0.032

With regard to the results of the table above, the null hypothesis (random effects method) is rejected at the confidence level of 95 and regression will be estimated through fixed effects method.

Table 7. Estimation of model 2

Variable	Coefficient		Std. Error	t-Statistic	Prob.
β_0	16.203		0.400	40.496	0.000
EARN	0.867		0.657	1.319	0.187
EARN*SFCF	-0.002		0.004	-0.542	0.587
EARN*CG	0.110		0.047	2.347	0.019
EARN*CG*SFCF	0.673		0.094	7.122	0.000
EARN*SIZE	0.122		0.133	0.919	0.358
EARN*DEBT	-0.003		0.001	-2.219	0.026
EARN*LOSS	-0.002		0.002	-1.239	0.215
YR	-4.348		2.668	-1.633	0.102
	R-squared	0.406	Mean dependent var	28.088	
	Adjusted R-squared	0.334	S.D. dependent var	43.701	
	S.E. of regression	36.795	Sum squared resid	1054714.	
	F-statistic	5.619	Durbin-Watson stat	1.710	
	Prob(F-statistic)	0.000			

Based on model 2 whose information has been provided in Table 7 and with regard to the significance level obtained for the mediating role of good corporate mechanisms in the relationship between surplus free cash flow and earnings predictability, it can be argued that good corporate mechanisms have a positive role in the relationship between surplus free cash flow and earnings predictability. The amount of Student's t statistic obtained for this mediating role is equal to 7.1225 and type of mediation is positive, which shows that good corporate mechanisms enhance the relationship between surplus free cash flow and earnings predictability. Durbin-Watson statistic is 1.71 which suggests the absence of autocorrelation. Given the probability of F statistic, the total regression model is also significant at the confidence level of 95. Therefore, the second research hypothesis cannot be rejected at the confidence level of 95.

5.4 Third Hypothesis Testing

Since the aim is to compare small and large companies, to test the third hypothesis, model 2 (second hypothesis model) has been applied so that this model was tested once for small companies and once for large companies.

Table 8. Estimation of model 2 for large companies

Variable	Coefficient		Std. Error	t-Statistic	Prob.
β_0	0.063		0.002	30.952	0.000
EARN	4.700		7.120	0.660	0.511
EARN*SFCF	-1.860		4.690	-0.397	0.692
EARN*CG	0.001		0.000	4.055	0.000
EARN*CG*SFCF	0.002		8.650	29.228	0.000
EARN*SIZE	1.601		4.141	3.872	0.000
EARN*DEBT	-2.641		6.331	-0.416	0.678
EARN*LOSS	-2.530		8.540	-0.295	0.768
YR	-3.310		4.220	-0.784	0.435
	R-squared	0.497	Mean dependent var	2134.035	
	Adjusted R-squared	0.484	S.D. dependent var	166134.7	
	S.E. of regression	119281.0	Sum squared resid	7.140	
	F-statistic	38.234	Durbin-Watson stat	2.432	
	Prob(F-statistic)	0.000			

According to model 2 estimated for large companies whose information has been presented in Table 8 and with regard to the significance level obtained for the mediating role of good corporate mechanisms in the relationship between surplus free cash flow and earnings predictability in large companies, the amount of Student's t statistic obtained for this mediating role is equal to 29.22855 and type of mediation is positive, which shows that good corporate mechanisms in large companies enhance the relationship between surplus free cash flow and earnings predictability. Durbin-Watson statistic is 2.43 which suggests the absence of autocorrelation. Considering the probability of F statistic, the total regression model is also significant at the confidence level of 95.

Table 9. Estimation of model 2 for small companies

Variable	Coefficient	Std. Error	t-Statistic	Prob.
β_0	-2.001	1.311	-1.520	0.132
EARN	1.511	2.291	0.658	0.512
EARN*SFCF	-8.689	6.114	-1.128	0.262
EARN*CG	0.083	0.0254	2.294	0.001
EARN*CG*SFCF	2.950	4.500	6.556	0.000
EARN*SIZE	3.531	5.711	0.617	0.539
EARN*DEBT	-3.400	5.570	-0.611	0.542
EARN*LOSS	-6.481	2.700	-0.239	0.811
YR	-3.501	6.501	-0.539	0.591

R-squared	0.294	Mean dependent var	10460.85
Adjusted R-squared	0.278	S.D. dependent var	64360.84
S.E. of regression	55041.18	Sum squared resid	1.271
F-statistic	19.436	Durbin-Watson stat	1.698
Prob(F-statistic)	0.000		

Based on model 2 estimated for small companies whose information has been provided in Table 9 and with regard to the significance level obtained for the mediating role of good corporate mechanisms in the relationship between surplus free cash flow and earnings predictability in small companies, the amount of Student's t statistic obtained for this mediating role is equal to 6.5569 and type of mediation is positive, which shows that good corporate mechanisms in small companies enhance the relationship between surplus free cash flow and earnings predictability. Durbin-Watson statistic is 1.69 which indicates the absence of autocorrelation. Considering the probability of F statistic, the total regression model is also significant at the confidence level of 95.

By summing up what has been mentioned above, it can be argued that good corporate mechanisms can enhance the relationship between surplus free cash flow and earnings predictability in both small and large companies. But with regard to the amount of Student's t obtained and comparing it in the above two models, it can be stated that the positive impact of governance mechanisms on the relationship between surplus free cash flow and earnings predictability is more prominent in larger companies. Thus, the third research hypothesis is also confirmed.

6. Discussion and Conclusion

Earnings forecast by the management is considered among the most important information resources of investors and other parties because in capital markets, there are declarations and notifications that are published by the companies in connection with announcing the expected earnings per share. If earnings forecasts by the management enjoy the necessary precision, they can lead to the improvement of the decision-making process of users of accounting reports. Karamanou (2005) believes that corporate governance mechanisms affect the quality of information disclosed by the companies, including the information associated with earnings forecast. Besides, Norvative et al. (2010) state that corporate governance is a factor that can improve the quality of information provided by the management. In line with the results of the present study, Sabz Alipour et al. (2012) came to the same conclusions. They found that there is a significant positive relationship only between the percentage of non-executive board members and earnings forecast accuracy and no significant relationship exists between other components of corporate governance and earnings forecast accuracy. In this regard, Rezaei and Teimouri (2012) examined the interactive relationships between free cash flow risk, corporate governance structure and debt policy of companies. The results demonstrate that there is no significant relationship between the variables of corporate governance and free cash flow risk. But there is a significant negative relationship between board members independence and debt with free cash flow risk. In line with the research results, Adinehzadeh and Jaffar (2013) investigated the relationship between corporate governance and free cash flow of 211 companies listed in Malaysia Stock Exchange. The results showed a significant positive relationship between independence degree, size and appropriateness of the audit committee with the level of free cash flow.

The researcher's analysis regarding the existence of the moderating role of some corporate governance variables indicates that corporate governance rules in Tehran Stock Exchange have managed to moderate and neutralize some of the factors affecting the negative relationship between surplus free cash flow and earnings predictability. Considering the results obtained from the study, among these cases is the impact of corporate governance on this issue. The research results are consistent with the studies conducted by Haqiqat and Asadollahi (2011), Sabz Alipour et al. (2012) Resaeiyan et al. (2010), John et al. (2012) and Dehmari and Coesmaeil (2014).

Given the results of this study and to promote the efficiency of Tehran Stock Exchange, the following suggestions are provided:

Some actions have been taken in Iran concerning the corporate governance system. But the expansion of activities related to the establishment of a proper corporate governance system is essential. Proper establishment of these structures is a basic measure for optimum use of resources, promotion of accountability, transparency, conformity to justice and respect for the rights of all stakeholders of the company. With regard to the global wave of privatization and necessity of implementing the Article 44 of the Constitution for the economic development of the country based on social justice and poverty alleviation, formulation and application of the principles of corporate governance system in our country are important and inevitable for the development of capital market.

Considering the results of this study and to promote the better management of stock exchange companies, the following recommendations are presented:

According to the research results, surplus free cash flow has a negative impact on earnings predictability and with regard to the obtained results, the prominent effect of firm size on the negative relationship between surplus free cash flow and earnings predictability has been properly shown. Thus, free cash flow management particularly in large companies has great importance and priority.

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A Segmentation Study of Non-Performing Loans Rates in Turkish Credit Market

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Abstract

Non-performing loans (NPLs) rate is one of the main risks in commercial banks and is also a critical measure of the bank's financial performance and stability. Banks meet the growth rate of NPLs when the debtors are not able to meet their financial obligations in terms of repayment of loans. Regional diversification can impact NPLs rate as well as macroeconomic and bank-specific factors. The purpose of this study is to detect homogeneous credit risk groups by geographical locations. Diversification across regions can help banks and financial institutions to determine appropriate market areas and identify effective diversified investment strategies by reducing the overall risk of the credit portfolios.

Keywords: time series clustering, Turkey, credit market, non-performing loans rate

1. Introduction

There is a growing recognition that the quantity or percentage of non-performing loans (NPLs) is related to bank failures and the financial status of a country. Especially after the global financial crisis of 2007 to 2008, which started in the US and spread to whole world especially Europe, the issue of non-performing loans (NPLs) has attracted increasing attention because of the rapidly increased default of sub-prime mortgage loans. Moreover, there are some evidences that financial and banking crisis in East Asia and Sub-Saharan African countries were preceded by increasing non-performing loans. In this view of this reality, the non-performing loan ratio is, therefore, a critical measure to evaluate a bank's performance, the economic activity, and the national financial stability and soundness.

Lots of factors are responsible for NPLs rate. The literature generally classifies these factors into two parts, namely: macroeconomic and bank-specific factors. Beside these factors, NPLs rate may vary by region even under the same economic conditions. From this point of view, the purpose of this study is to find homogeneous credit risk groups by geographical locations. In particular, a number of hierarchical clustering algorithms (single, median, average, centroid, complete, ward and weighted) are run to the NPLs rates based on 81 Turkish cities. In order to choose the right number of cluster and to evaluate clustering results, Silhouette (S), Davies-Bouldin (DB), Calinski-Harabasz (CH), Dunn (D), Krzanowski-Lai (KL) and Hartigan (Han) validity indices and visual cluster validity (VCV) are used.

The rest of the paper is organized as follows. The second section provides an overview of the literature. Section three gives the details of the data set and theoretical framework adopted in this paper and section four provides the empirical results. Finally, section five gives a summary of the finding of the study.

2. Literature Review

This section reviews the previous empirical studies on determining factors of the NPLs. There are so many factors which are responsible for NPLs. The Literature generally divides these factors into two groups. This first group of literature focuses on the country specific macroeconomic variables such as unemployment, interest rate, gross domestic product, inflation etc. and the other social variables, which are likely to affect borrowers' payment capacity to their loans. The second group is called bank-specific factors such as strategy choices, management excellence, income margins, policy choices, the risk profile of banks etc. (Klein, 2013). Although there are so many studies to detect factors which are responsible of NPLs, unfortunately there is no any previous study regarding finding homogeneous credit risk groups by geographical locations.

Several studies were done to determine factors of NPLs on different banking systems in different countries. Table 1 indicates NPLs studies which were done in the US

Table 1. Summary of NPLs studies on the US

Paper	Variables	Period of Data	Algorithms	Finding
Keeton and Morris (1987)	Loan losses for over 2.400 US commercial banks	1979-1985	Simple linear regression	Local economic conditions, the poor performance of agriculture and energy sectors explain the variation in loan losses in commercial banks of the US.
Sinkey and Greenwalt (1991)	NPLs of big commercial banks in the US	1984-1987	Log-linear regression	Several factors such as high-interest rates, excessive lending and volatile funds as having a positive impact on NPLs of commercial banks in the US.
Gambera (2000)	Sample of US banks' delinquencies	1987-1999	Bivariate VAR models	Farming income, unemployment rate, housing permits, state annual permits and bankruptcy fillings explain the quality of bank asset.

NPLs are not only the problem of America but also the problem of the whole world so we focus on the studies conducted in the European countries and the rest of the world countries, respectively. Table 2 shows NPLs studies which focus on European countries.

Table 2. Summary of NPLs studies on Europe

Paper	Variables	Period of Data	Algorithms	Finding
Salas and Saurina(2002)	Loans loss of commercial and saving banks with macroeconomic variables in Spain	1985-1997	Dynamic model	Real growth in GDP, rapid credit expansion, bank size, capital ratio and market power explain variation in NPLs
Hoggarth, Sorensen and Zicchino(2005)	Bank loan loss with macroeconomic variables in the UK	1988-2004	VAR model	Inflation and interest rates have a positive relationship with the non-performing loans.
Chaibi and Ftiti (2015)	NPLs of commercial banks in France and Germany	2005-2011	Dynamic panel data approach	Macro-economic (specifically GDP growth,interest rate, unemployment rate, and exchange rate) and bank-specific variables have an effect on loan quality in the both countries. According to the results, French economy is more susceptible to bank-specific determinants rather than Germany
Kalirai and Scheicher(2002)	NPLs in the Austria banking sector	1990-2001	Linear regression	Short-term nominal interest rate, industrial production, the stock market return and a business confidence index explain loan quality in Austria.
Louzis, Vouldis and Metaxas(2010)	NPLs in 9 largest Greek banks	2003-2009	Dynamic panel data methods	Real GDP growth rate, the unemployment rate and the lending rates are determinants of NPLs
Bofondi and Ropele(2011)	NPLs in Italy	1990-2010	Single-equation time series	NPLs is positively associated with the unemployment rate and the short-term nominal interest rate, while inversely associated with the growth rates of real gross domestic product and house prices.
Berge and Boye(2007)	NPLs in Nordic banking system	1993-2005	ARCH model	NPLs are highly associated with the lending and unemployment rates.
Klein (2013)	NPLs in different 16 European countries (Central, Eastern and South-Eastern Europe) with bank-specific and macroeconomic variables	1998-2011	Panel data model	The quality of NPLs can be explained by macroeconomic variables mainly. There is a feedback effect on the loan quality.

Table 3 points out NPLs studies which concern on developing countries.

Table 3. Summary of NPLs studies on developing countries

Paper	Variables	Period of Data	Algorithms	Finding
Dash and Kabra(2010)	Macroeconomic and bank specific variables on NPLs of Indian commercial banks	1998-2008	Panel data model	Real income has negative significant effect on NPLs on the other hand high-interest rate incur greater NPLs
Shu (2002)	NPLs in Honk Kong	1995-2002	Linear regression	NPLs is negatively affected by the consumer price inflation rate, gross domestic product growth, property prices growth, but positively affected by nominal interest rates.
Khemraj and Pasha (2009)	NPLs with macroeconomic and bank-specific variables in Guyanes banking sector	1994-2004	Panel repression model	The Real effective exchange rate has a positive relationship with NPLs on the other hand growth in gross domestic product has a negative relationship with NPLs. Moreover, there is a positive relationship between lending rate and NPLs.
Fofack (2005)	NPLs in Sub-Saharan African Countries		Panel-based model	Economic growth, real exchange rate appreciation, the real interest rate, net interest margins, and inter-bank loans have significant effects on NPLs

The above studies are concerned about conventional banking but NPLs are not only the problem of conventional banking system also of Islamic banking. Table 4 indicates NPLs studies on Islamic banking system.

Table 4. Summary of NPLs studies on Islamic banking system

Paper	Variables	Period of Data	Algorithms	Finding
Adebola, Wan Yusoff, and Dahalan (2011)	NPLs in the Islamic banking sector in Malaysia	2007-2009	ARDL method	Interest rate has a positive relationship with NPLs on the other hand producer price index has a negative relationship with NPLs
Siddiqui, Malik and Shah(2012)	NPLs in Pakistan	1996-2011	Garch Model	NPLs are associated with volatility on interest rate

From the above literature review, it is obvious that we can identify the macroeconomic and bank-specific variables which have a strong relationship with the performance of loans. Otherwise, there is no any prior study analyzing homogeneous credit risk groups in terms of NPLs rates by geographical locations in Turkey, an emerging market. At this view, our paper is the initial academic study to analyze groups of cities with similar credit risk on the performance of loans.

3. Turkish Credit Market and Non-Performing Loans

Banking institutions play a very important role in Turkish financial system. According to the last updated 2016 statistics, total banks' assets are around numbers which is 96 percentage of the total assets of financial systems. Some financial statistics of banking sector are given on Table 5.

Table 5. Financial statistics of banking sector

Billion USD Dolar	1980	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015
Deposit	9	33	45	102	189	400	370	433	443	555	429
Loans	10	27	29	51	114	331	352	433	477	520	500
Assets	19	58	69	155	296	626	614	730	768	812	766
% Loans/GDP	-	-	-	20.5	23.6	46.3	51.2	54.3	64.8	69.2	74.7
% Assets/GDP	-	-	-	62.5	61.2	87.5	89.4	91.6	104.3	108	114.5
% Loans/Assets	53.7	47.0	42.5	32.9	38.6	52.9	57.2	59.2	62.1	64.1	65.2
%Loans/Deposit	109.6	84.0	65.4	50.0	60.4	82.8	95.1	99.9	107.7	114.4	116.6

Source: The Banks Association of Turkey

The financial liberalization process is started in the 1980s in Turkey. During this decade, so many structural changes occurred in the financial market: abolishing ceilings on interest, setting up interbank money market, establishing Capital Marked Board (CMB) and Istanbul Stock Exchange (ISE). These liberalization attempts have enhanced the efficiency, the competition and increased the availability and sources of finance in the financial market, considerably (Yayla, Hekimoğlu and Kutlukaya, 2008).

During the 1990s, although there is a legal regulation in banking and financial services fields, the autonomous authority are still missing to use this legal regulation. From the point of the necessity, Banking Regulation and

Supervision Agency (BRSA) is founded authority to regulate and supervise the banking sector as the independent in 2000. All these positive developments make the Turkish banking sector move away from the traditional banking activities (BRSA, 2001).

We can see easily the important financial developments regarding bank balance sheets since the 1980s. Total assets of the banking sector increased from 19 Billion USD 1980 (62.5 % of GDP) to 766 Billion USD (114.5 % of GDP) in 2015. Moreover deposit significantly increased from 9 Billion USD in 1980 to 429 Billion USD in 2015, which is 4.667 % increasing. The share of loans in total assets of the banking sector decreased from 47.0 % in 1990 to about 32.9 % in 2000 and increased to 65.2 % in 2015. The ratio of loans to deposits declined from 84 % in 1990 to 50 % in 2000 and increased to 116.6 % in 2015. The total loans to GDP ratio is increased from 20.5 % in 2000 to about 74.7 % in 2015. Figure 1 shows the development of loans and economic growth of Turkish banking sector.

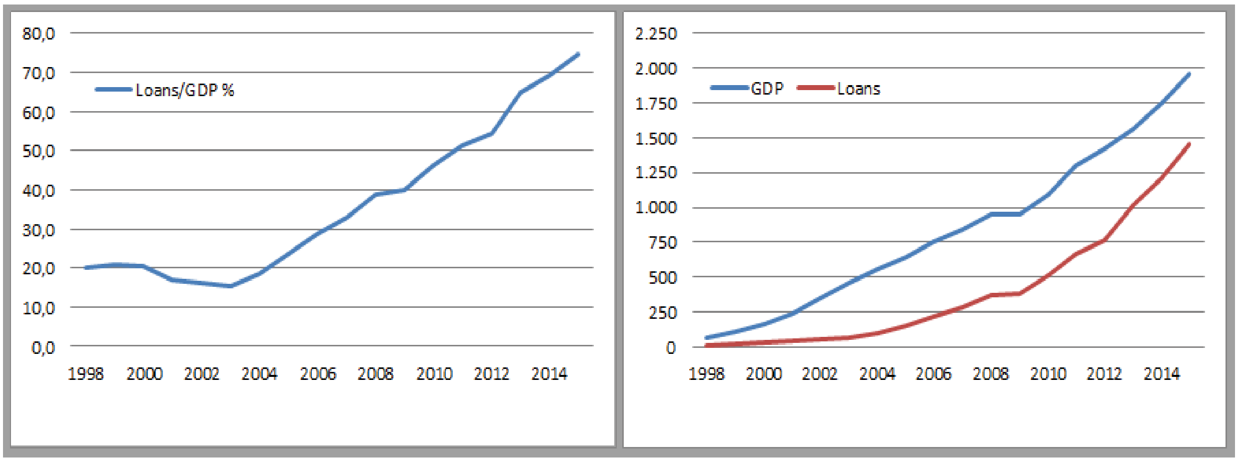

Figure 1. Development of Loans and Economic Growth (Billion TL)

The Turkish banking sector was severely tested by local and global financial crises in 1994, 2000, 2001 and 2008. These financial crises badly impact on the Turkish economy and the banking sector. To get a better sense of the banking sector in aggregate loan quality, we look at the loan performance shown in Figure 2.

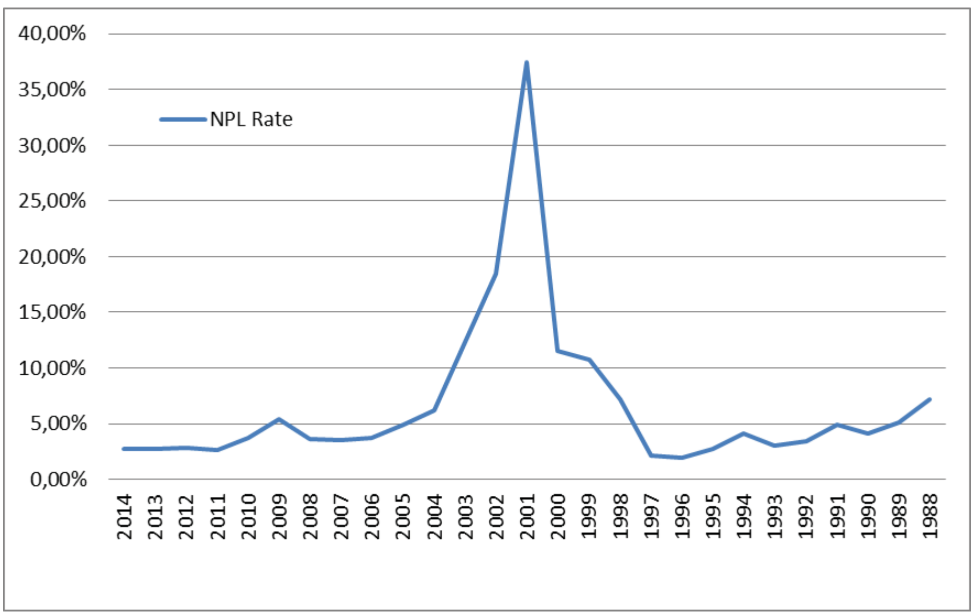

Figure 2. The Development of NPLs/Total Loans in Turkish Banking Sector

As seen from Figure 2, there are gradual increases in the NPLs rate before the economic crisis 2001 in Turkish banking sector. NPLs rate is 2.13% in 1997, raised significantly to 37.44% in 2001. Between 1997-2002, 21 banks with poor financial structure were transferred to Saving Deposit Insurance Fund (Yayla, Hekimoğlu and Kutlukaya, 2008).

The main reason for the increase in NPLs rate in Turkish Banking sector is that the regulatory institutions were not independent from the political authority to regulate and supervise the banking sector effectively. With establishing Banking Regulation and Supervision Agency (BRSA) NPLs rate falls down significantly (BRSA, 2001). From this point it can be said that Turkish banking sector is completely different before the economic crises in 2001.

4. Data and the Theoretical Framework

In the following subsections, we give a summary of data and such a sort explanation of the theoretical scheme of the time series clustering models and cluster procedures respectively.

4.1 Overview of Data

The aim of this study is to detect homogenous credit risk groups for Turkish credit market based on 81 Turkish cities. For the description of the potential credit risk, we use individually the aggregate rate of nonperforming loans (NPLs) for each city which consists of all kind of loans including consumer, housing, auto, credit cards and the other loans of all banks.

Based on the countries' financial condition and legislation, non-performing loans' term (NPLs) can be different. In Turkey, non-performing loans are defined as a loan that hasn't been paid for ninety days or more. NPLs rate is basically the amount of non-performing loans over total loans, expressed as a percentage. The time series data covers the quarterly period 2007Q4 – 2014Q1, a total of 26 observations, because of the data availability and is collected from Banking Regulation and Supervision Agency. Table 6 summaries some descriptive statistics of NPLs rates of these 81 cities.

Table 6. Summary statistics of the NPLs rates from 2007Q4 to 2014Q1

Cities	Average	Min	Max	Sandart Deviation	Cities	Average	Min	Max	Sandart Deviation
ADANA	5,09%	3,81%	7,71%	1,16%	KAHRAMANMARAŞ	3,08%	1,83%	5,42%	1,19%
ADIYAMAN	3,13%	2,36%	5,03%	0,80%	KARABÜK	4,08%	1,92%	8,97%	2,24%
AFYONKARAHİSAR	3,55%	2,31%	5,67%	1,03%	KARAMAN	2,10%	1,02%	3,43%	0,72%
AĞRI	3,99%	1,89%	7,04%	1,87%	KARS	4,39%	2,62%	6,98%	1,43%
AKSARAY	3,25%	2,00%	5,00%	0,82%	KASTAMONU	2,70%	1,53%	4,59%	0,89%
AMASYA	3,37%	1,63%	5,97%	1,20%	KAYSERİ	5,24%	2,76%	9,05%	2,17%
ANKARA	3,25%	2,37%	4,66%	0,66%	KIRIKKALE	4,29%	2,92%	7,02%	1,25%
ANTALYA	3,87%	2,37%	6,07%	0,98%	KIRKLARELİ	3,75%	1,76%	6,20%	1,24%
ARDAHAN	4,79%	2,03%	8,68%	2,58%	KIRŞEHİR	2,12%	1,28%	3,55%	0,78%
ARTVİN	5,07%	2,78%	8,99%	1,92%	KİLİS	3,69%	2,09%	6,13%	1,29%
AYDIN	4,60%	2,01%	8,41%	1,71%	KOCAELİ	2,99%	2,04%	5,31%	1,00%
BALIKESİR	3,30%	2,16%	5,79%	1,13%	KONYA	3,93%	2,52%	6,66%	1,29%
BARTIN	3,77%	1,59%	6,10%	1,16%	KÜTAHYA	4,78%	3,44%	7,67%	1,29%
BATMAN	3,87%	2,58%	5,80%	0,92%	MALATYA	3,16%	1,97%	5,25%	0,98%
BAYBURT	4,22%	1,29%	9,38%	2,44%	MANİSA	3,74%	2,29%	6,59%	1,33%
BİLECİK	4,07%	2,27%	7,19%	1,46%	MARDİN	3,14%	2,22%	4,47%	0,61%
BİNGÖL	1,41%	0,89%	1,99%	0,31%	MERSİN	4,57%	3,32%	7,63%	1,24%
BİTLİS	2,97%	1,08%	6,09%	1,74%	MUĞLA	4,24%	1,57%	7,34%	1,58%
BOLU	2,89%	1,31%	5,60%	1,27%	MUŞ	4,09%	1,94%	7,70%	1,76%
BURDUR	3,62%	1,36%	6,11%	1,32%	NEVŞEHİR	3,56%	1,92%	5,72%	1,15%
BURSA	3,67%	2,40%	6,69%	1,36%	NİĞDE	2,21%	0,84%	3,81%	0,76%
ÇANAKKALE	3,62%	1,35%	5,71%	1,11%	ORDU	3,43%	1,31%	6,51%	1,47%
ÇANKIRI	2,81%	1,28%	4,81%	1,00%	OSMANİYE	3,06%	2,07%	4,83%	0,84%
ÇORUM	3,11%	1,78%	5,04%	0,95%	RİZE	2,88%	1,71%	4,89%	0,96%
DENİZLİ	6,07%	3,15%	12,61%	2,41%	SAKARYA	4,26%	2,69%	8,04%	1,57%
DİYARBAKIR	5,44%	3,48%	7,91%	1,21%	SAMSUN	3,91%	1,62%	7,43%	1,66%
DÜZCE	5,37%	2,68%	8,70%	1,69%	SİİRT	2,26%	0,81%	4,40%	1,40%
EDİRNE	3,20%	2,12%	5,40%	1,04%	SİNOP	2,45%	1,56%	3,48%	0,66%
ELAZIĞ	3,38%	1,99%	5,49%	1,06%	SİVAS	4,36%	2,55%	7,02%	1,41%
ERZİNCAN	2,91%	1,87%	4,59%	0,80%	ŞANLIURFA	4,45%	3,18%	6,90%	1,08%
ERZURUM	4,45%	2,00%	7,11%	1,96%	ŞIRNAK	3,45%	2,64%	5,43%	0,84%
ESKİŞEHİR	2,96%	2,08%	5,29%	0,96%	TEKİRDAĞ	4,04%	2,20%	7,57%	1,64%
GAZİANTEP	3,66%	1,78%	7,18%	1,74%	TOKAT	3,69%	2,00%	5,66%	1,12%
GİRESUN	4,76%	2,98%	7,77%	1,39%	TRABZON	4,24%	2,61%	7,55%	1,51%
GÜMÜŞHANE	3,39%	0,94%	7,16%	1,53%	TUNCELİ	1,26%	0,59%	2,18%	0,39%
HAKKARİ	3,81%	1,85%	7,01%	1,65%	UŞAK	4,19%	2,40%	6,94%	1,36%
HATAY	2,38%	1,41%	3,77%	0,76%	VAN	3,34%	2,12%	4,97%	0,78%
IĞDIR	5,54%	3,53%	8,74%	1,80%	YALOVA	3,47%	1,62%	6,07%	1,25%
ISPARTA	3,31%	1,37%	6,32%	1,32%	YOZGAT	3,47%	2,45%	4,41%	0,54%
İSTANBUL	3,70%	2,20%	7,22%	1,56%	ZONGULDAK	4,95%	2,45%	8,74%	1,74%
İZMİR	4,61%	3,23%	7,26%	1,24%					

4.2 Theoretical Framework

4.2.1 Clustering

Time series clustering is an unsupervised technique for finding similar/homogenous groups in data, called clusters, based on similarity or dissimilarity measures. Hence, time series are similar in the same cluster. Clustering techniques have been applied to a wide variety of fields such as finance, computer sciences, engineering, life and medical sciences, earth sciences, social sciences and economics (Xu and Wunsch, 2005). While many clustering techniques were studied in different domains, most of these techniques are based on the assumption that data objects can be given as static points in multidimensional spaces. Unfortunately, the assumption does not always work. As an important class of these problems, time series is a sequence of data points changed with the time that founded in many application from science, engineering, business, finance, economics, health care to other domains (Liao, 2005).

A wide range of cluster methods is available for the static data in the literature. Han and Kambar (2001) divided clustering techniques for handling various static data into five main groups: hierarchical, partitioning, density-based, model-based, and grid-based techniques. Otherwise, diverse algorithms have been evolved to cluster a bunch of different forms of time series data. As stated by Liao (2005), there are three major approaches in time series clustering: raw-data-based, feature-based and model-based. The existing static data clustering algorithms can be applied for the time series data directly. This approach is called raw-data-based clustering. The main logic of this approach depends on replacing the distance/similarity measure for static data with a suitable one for time series. Beside this approach, there are feature-based and model-based methods which use features or model parameters of time series for conventional clustering algorithms, respectively (Liao, 2005).

In this study, hierarchical clustering methods are used because of the following reasons: great visualization feature, the capability of using time series with different length and working without knowing any parameter such as the number of clusters (Xu and Wunsch, 2005 ; Liao, 2005).

Hierarchical clustering technique basically organizes data by creating a tree of clusters based on the distance or similarity between them. The cluster tree named a dendrogram is generally used to show the process of hierarchical clustering. It displays how data points are clustered together bit-by-bit. Clustering outcomes can be kept by cutting the dendrogram at different levels. This representation gives very informative summaries and visualization for the potential data clustering frames (Xu and Wunsch, 2005 ; Liao, 2005).

There are commonly known two groups of hierarchical clustering approaches: agglomerative and divisive. The agglomerative approach starts by placing each observation in its own clusters and then merges these pair of initial clusters into larger and larger clusters, until all observations are in a single cluster or until certain final willed number of clusters fulfilled. The divisive approach does just the inverse of agglomerative hierarchical clustering by starting with all points in one cluster. It split the cluster into smaller and smaller groups (Han and Kamber, 2001). Figure 3 displays a dendrogram of divisive hierarchical clustering approach for 7 time series (Keogh and Kasetty, 2003).

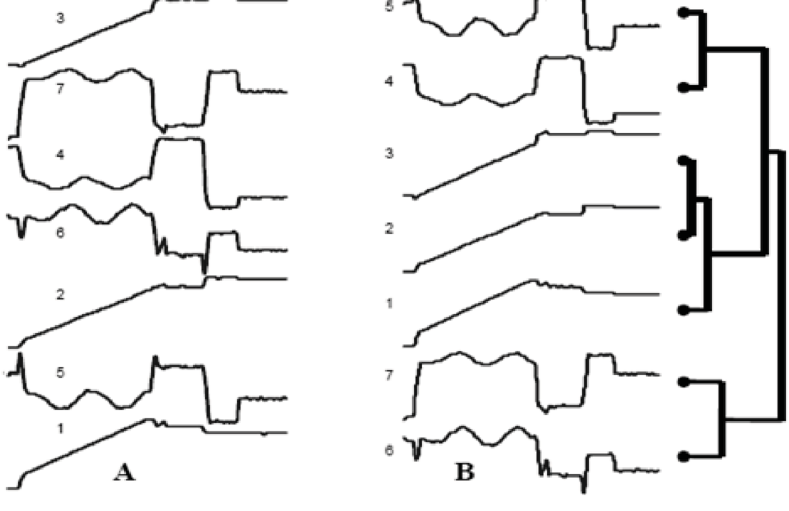

Figure 3. A Hierarchical clustering of 7 time series

4.2.2 Clustering Procedure

Raw-data-based time series cluster analysis basically consists of three main steps:

1. **Clustering Algorithm Design or Selection:** Choosing clustering algorithm affects the quality of clustering results. Almost all clustering algorithms directly work on proximity (similarity/dissimilarity) measures, which affect the quality of these results, either. Therefore, it is crucial to carefully select right proximity measures and cluster algorithms in order to design an appropriate cluster strategy and to get more homogenous clusters (Xu and Wunsch, 2005 ; Liao, 2005).
2. **Cluster Validation:** Clustering validation is concerned with the evaluation of the goodness of clustering results. To get good clustering results, it helps to learn which clustering proximity measures and clustering algorithms should be chosen, how many clusters are hidden in the data, wherever the clusters obtained are meaningful, well separated and homogenous (Xu and Wunsch, 2005 ; Liao, 2005).
3. **Result Interpretation:** The main purpose of clustering is to provide users meaningful knowledge from the raw data then it can help to solve problems encountered. (Xu and Wunsch, 2005 ;Liao, 2005).

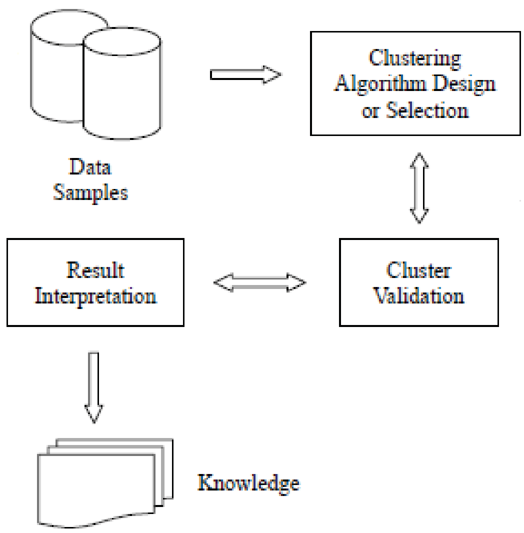

Figure 4. Clustering procedure (Xu and Wunsch, 2009)

Figure 4 presents the three steps of the clustering procedure. Cluster analysis is not a one-shot process. In many cases, it is repetition until finding satisfied cluster results.

5. Development of the Clustering Model and Evaluation of Study Results

As mentioned above, raw-data-based time series cluster procedure consists of three steps. In the first step, namely clustering algorithm design/selection step, we need to choose right proximity measure (similarity or dissimilarity metric) and clustering algorithm to get more accurate homogeneous results.

In this study, single, median, average, centroid, complete, ward and weighted hierarchical clustering algorithms are run with proximity measures such as Euclidean, Cityblock, Minkowski, Chebychev, Mahalanobis, Cosine, correlation and spearman to the 81 Turkish cities' NPLs rates by using Matlab R2012b statistics toolbox. Silhouette (S), Davies-Bouldin (DB), Calinski-Harabasz (CH), Dunn (D), Krzanowski-Lai (KL) and Hartigan (Han) validity indices are run to measures their performance and compared with the result of visual cluster validity (VCV) All the details of all these algorithms, proximity measures and validity indices can be obtained from the Cluster Validity Analysis Platform (Wang, 2007; Xu and Wunsch II, 2005, 2009).

Silhouette index is used to select right proximity measures with right clustering algorithms as selecting criteria. Silhouette index ranges from -1 to +1. High values mean that the quality of clustering results is appropriate. On the other hand, low or negative values means that cluster results are poor. From this point, the highest Silhouette value indicates that the best clustering algorithm and proximity measures are respectively complete hierarchical clustering algorithm and Euclidean for this data .

The second step in clustering process is cluster validation where we decide optimum the number of clusters and evaluate whether the goodness of results is satisfying or not. We use Euclidean proximity measure which is the representative distance measurement to assess the inter-object similarity/dissimilarity in the hierarchical clustering algorithm, and it is the straight-line distance between data points in multi-dimensional space. It concentrates on the degree of the distances and data points that are near to each other. In this study, the 81x81 Euclidean distance matrix is chosen as input of clustering, to maximize the distances between heterogeneous credit markets (similarly minimizing the distance within grouped credit markets). After getting the distance matrix, we run single, median, average, centroid, complete, ward and weighted hierarchical clustering algorithms to classify the individual univariate NPLs rates of the 81 Turkish cities into 10 clusters. Then Silhouette (S), Davies-Bouldin (DB), Calinski-Harabasz (CH), Dunn (D), Krzanowski-Lai (KL) and Hartigan (Han) validity indices[1] are run to determine the number of optimum clusters. Table 7 shows the cluster validity index results obtained from Matlab Statistics Toolbox and the Cluster Validity Analysis Platform (Wang, 2007).

Table 7. Optimum cluster numbers for 81 NPLs rates

Cluster Algorithms	S	DB	CH	D	KL	Han
Average	2	2	7	2	2	2
Centroid	2	2	7	2	2	2
Complete	2	4	3	2	2	2
Median	2	2	5	2	2	2
Single	2	2	3	2	2	2
Ward	3	2	2	2	2	2
Weighted	2	2	3	2	2	2

In Table 7, Davies-Bouldin and Calinski-Harabasz indices suggest different cluster numbers compared to other validity indices where Silhouette, Dunn, Krzanowski-Lai and Hartigan indicate two optimum clusters. The frequency of cluster numbers is 2 that highlight the true number of clusters in these data depended on these indices. But deciding a convenient cluster number is still exacting problem. In order to overcome this exacting problem, visual approaches (visual cluster validity) can be applied (Bezdek and Hathaway, 2002). The cluster validity (VCV) is the one of the visual approaches for multi-dimensional data. The basic logic behind this approach is to map the data into an image schema, applying the grey or colors scale values to show the important degree of each variable for every data points (Hepşen and Vatansever, 2012).

The VCV approach replaces rows and columns of the similarity/dissimilarity matrix applying the cluster classes after some clustering algorithms have been run. Otherwise, the original order of data points has been classified such that the members of every cluster lie in sequential rows and columns of the permuted proximity matrix. It is obvious that assigned light (dark, depending on the grey scale) squares along the diagonal show compact clusters indicating well separated from neighboring points. If there is no contain significant clusters in the data then this is easily seen in the image (Hepşen and Vatansever, 2012).

In this paper, the VCV approach is used to evaluate the cluster validity of this data. The input data is directly calculated from the data as Euclidean distance. The images linked to the results of complete hierarchical clustering algorithm are given in below Figure 5.

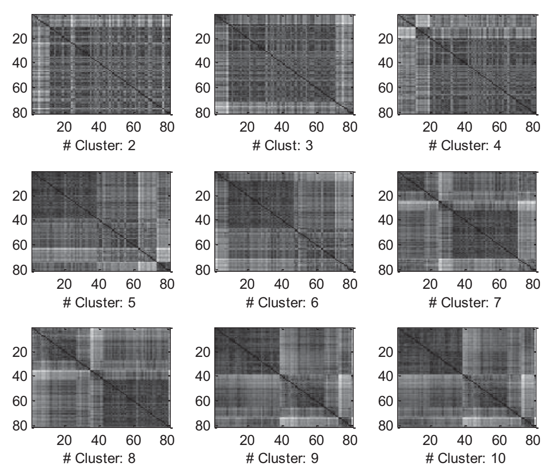

Figure 5. Results of complete hierarchical clustering algorithm

[1]Cluster validation is to measure the goodness of clustering results. There are several numerical measures titled validity indices that are classified into two categories: external and internal validity indices (Aghabozorgi, Shirkhorshidi and Wah, 2015).

It should be understood that, while the data are classified by 2, 3, 4, 5, 6, 7, 8, 9 and 10; this will not inevitably be indicated in unsupervised clustering, e.g. there may not be enough features to allow the cluster. We can notice the unclear area in the large dark block with fuzzy boundaries which means the cluster may consist of two or more overlapped clusters in it with very similar association to each other in Figure 5. Moreover, it is also given that there are three cluster blocks where diagonal dark blocks are clearer. That gives we have three optimum clusters on this data set. Figure 7 gives the dendrogram of "Complete" hierarchical cluster algorithm and each color displays each cluster sets for NPLs rates in Turkish credit market.

It is also important to test the how clusters differ from each other. To do this, a one-way ANOVA is done on the data set as shown in table 8.

Table 8. ANOVA test results for clusters

Source	SS	df	MS	F	Prob>F
Groups	1182.41	2	591.205	291.86	1.37233e-112
Error	4259.9	2103	2.026		
Total	5442.31	2105			

A high value of F-ratio and a low significance value imply that there is a large difference between means of clusters. As can be seen from table 8, the means for three clusters are quite different (meaning clusters are statistically different from each other). This result, however, does not provide more information on which group means are different. From this point, it is a necessity to determine whether all clusters are different each other. In order to make a multiple comparisons, Tukey, Benferroni, Dunn and Sidák, Fisher and Scheffé tests are used. According to those test results, all clusters are statistically different from each other. Moreover, figure 6 shows the difference between clusters based on median and quantiles.

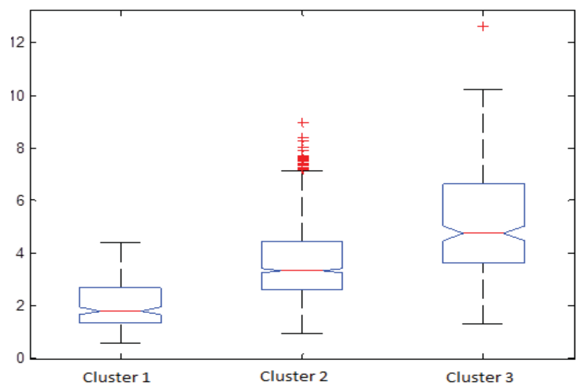

Figure 6. Boxplot for three clusters

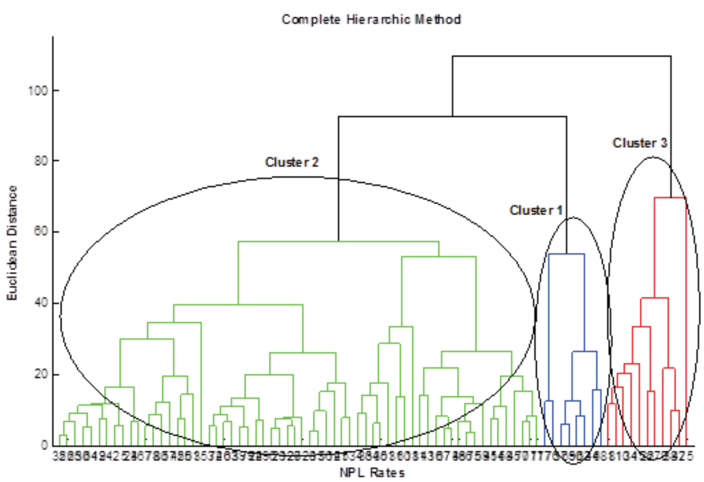

Figure 7. Dendrogram of complete hierarchical clustering algorithms

The three – cluster partition of the cities reveal a clear NPLs rate separation of credit markets given in Table 10, 11 and 12. Cluster 1 is composed of 8 cities, which have the lowest NPLs rates over the period of 2007Q4 to 2014Q1. 62 cities are grouped in Cluster 2. The rest 11 cities belong to Cluster 3. In those cities, NPLs rates are separately higher than the other two clusters, so they are described "risky" credit market areas. In this investment viewpoint for NPLs rates minimization, sub-market divided by NPLs rates has little correlation themselves, so it can be the convenient standard for creditors to make right loans portfolio to diversify potential risks.

Table 9 shows the basic descriptive statistics for NPLs rates based on clusters. As can be noticed, the lowest risky cities are all in the cluster 1 (average 2.02%), while the third cluster has the highest risky cities (average 5.14%). Other side, high NPLs rates are related to higher level of risk (standard deviation). The highest level of risk is in cluster 3 (standard deviation 0.48%) and the lowest level of risk is in cluster 1 (standard deviation 0.32%).

Table 9. Descriptive statistics of all clusters from 2007Q4 to 2014Q1

Clusters	Average	Standard Deviation
Cluster 1	2,02%	0,32%
Cluster 2	3,65%	0,34%
Cluster 3	5,14%	0,48%

Table 10. Descriptive statistics of cluster 2 based on cities from 2007Q4 to 2014Q1

Cluster 2					
Cities	**Average**	**Standart Deviation**	**Cities**	**Average**	**Standard Deviation**
ADIYAMAN	3,13%	0,80%	KARABÜK	4,08%	2,24%
AFYONKARAHİSAR	3,55%	1,03%	KARS	4,39%	1,43%
AĞRI	3,99%	1,87%	KASTAMONU	2,70%	0,89%
AKSARAY	3,25%	0,82%	KIRIKKALE	4,29%	1,25%
AMASYA	3,37%	1,20%	KIRKLARELİ	3,75%	1,24%
ANKARA	3,25%	0,66%	KİLİS	3,69%	1,29%
ANTALYA	3,87%	0,98%	KOCAELİ	2,99%	1,00%
AYDIN	4,60%	1,71%	KONYA	3,93%	1,29%
BALIKESİR	3,30%	1,13%	KÜTAHYA	4,78%	1,29%
BARTIN	3,77%	1,16%	MALATYA	3,16%	0,98%
BATMAN	3,87%	0,92%	MANİSA	3,74%	1,33%
BİLECİK	4,07%	1,46%	MARDİN	3,14%	0,61%
BİTLİS	2,97%	1,74%	MERSİN	4,57%	1,24%
BOLU	2,89%	1,27%	MUĞLA	4,24%	1,58%
BURDUR	3,62%	1,32%	MUŞ	4,09%	1,76%
BURSA	3,67%	1,36%	NEVŞEHİR	3,56%	1,15%
ÇANAKKALE	3,62%	1,11%	ORDU	3,43%	1,47%
ÇANKIRI	2,81%	1,00%	OSMANİYE	3,06%	0,84%
ÇORUM	3,11%	0,95%	RİZE	2,88%	0,96%
EDİRNE	3,20%	1,04%	SAKARYA	4,26%	1,57%
ELAZIĞ	3,38%	1,06%	SAMSUN	3,91%	1,66%
ERZİNCAN	2,91%	0,80%	SİVAS	4,36%	1,41%
ERZURUM	4,45%	1,96%	ŞANLIURFA	4,45%	1,08%
ESKİŞEHİR	2,96%	0,96%	ŞIRNAK	3,45%	0,84%
GAZİANTEP	3,66%	1,74%	TEKİRDAĞ	4,04%	1,64%
GÜMÜŞHANE	3,39%	1,53%	TOKAT	3,69%	1,12%
HAKKARİ	3,81%	1,65%	TRABZON	4,24%	1,51%
ISPARTA	3,31%	1,32%	UŞAK	4,19%	1,36%
İSTANBUL	3,70%	1,56%	VAN	3,34%	0,78%
İZMİR	4,61%	1,24%	YALOVA	3,47%	1,25%
KAHRAMANMARAŞ	3,08%	1,19%	YOZGAT	3,47%	0,54%

Table 11. Descriptive statistics of cluster 1 based on cities from 2007Q4 to 2014Q1

Cluster 1		
Cities	**Average**	**Standard Deviation**
BİNGÖL	1,41%	0,31%
HATAY	2,38%	0,76%
KARAMAN	2,10%	0,72%
KIRŞEHİR	2,12%	0,78%
NİĞDE	2,21%	0,76%
SİİRT	2,26%	1,40%
SİNOP	2,45%	0,66%
TUNCELİ	1,26%	0,39%

Table 12. Descriptive statistics of cluster 3 based on cities from 2007Q4 to 2014Q1

Cluster 3		
Cities	**Average**	**Standard Deviation**
ADANA	5,09%	1,16%
ARDAHAN	4,79%	2,58%
ARTVİN	5,07%	1,92%
BAYBURT	4,22%	2,44%
DENİZLİ	6,07%	2,41%
DİYARBAKIR	5,44%	1,21%
DÜZCE	5,37%	1,69%
GİRESUN	4,76%	1,39%
IĞDIR	5,54%	1,80%
KAYSERİ	5,24%	2,17%
ZONGULDAK	4,95%	1,74%

Different employment conditions can affect the NPLs ratio. Gamberea (2000); Chaibi and Ftiti (2015); Louzis, Vouldis and Metaxas (2010); Bofondi and Ropele (2011); Berge and Boye (2007) indicate that there is a positive relationship between NPLs rates and unemployment rates in the USA, France, Germany, Greece, Italy and Nordic countries, respectively. From this point, to get better understanding about the cities' NPLs dynamics, we look at 2013 unemployment rate at the on Table 13. As seen from the table, there is a negative correlation between NPLs rates and average employment rate in clusters. In conclusion, the credit risk is different under the different employment conditions.

Table 13. Average employment rate for clusters

Clusters	Average Employment Rate %
1	48,46
2	46,11
3	43,95
Country Average	45,90

Source: Turkish Statistics Institute

6. Conclusion

The existing literature is generally in interested in finding the effects of macroeconomic and bank-specific factors on NPLs rates. Besides those factors, NPLs rates may vary by region even under the same economic conditions. From this point, the aim of this study is to develop homogeneous credit risk groups for 81 cities in Turkey by running numerous hierarchical clustering algorithms.

This research adds to the literature in two aspects. First, it gives new information about Turkey's credit market in the context of risk diversification based on the different cities. Second, the time series clustering algorithms are discussed in this research gives a valuable guideline for bankers and financial intuitions for selecting proper market areas, to manage the potential geographical risk and define efficiently diversified credit politics.

Firstly, the empirical results of this research say the three different group partitions of the cities that declare a clear NPLs rates distinction of the credit market in Turkey. 8 cities are grouped in Cluster 1, which have the lowest NPLs rates (average 2.02% NPLs rate). Cluster 2 consists of 62 cities, which is the most crowded group. The rest 11 cities belong to Cluster 3. In those cities, NPLs rates are relatively higher than the other two groups (average 5.14% NPLs rate), so they are called risky credit market areas. On the other hand, high NPLs rates associated with higher levels of risk (standard deviation) and vice versa. Secondly, the results of this study could not be only practical for understanding the historical NPLs behaviors of cities, but also for banks and financial intuitions to make rational credit politics based on different geographic location conditions.

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Segment Information: What Do European Small and Mid-Caps Disclose?

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Abstract

The adoption of the IFRS 8 accounting standard symbolises the IASB's dual commitment: an effort toward convergence and harmonisation with the American standard, but also an effort to optimise the standardisation process through an unprecedented study: a post-implementation review. Many studies have laid the groundwork for an implementation review of the standard, mostly focusing on large firms. However, intermediate-size companies – which are much more numerous – are also faced with the application of IFRS standards. In this context, our study aims to analyse the implementation of IFRS 8 by a sample of intermediate-size European listed companies. Our research questions mainly focus on issues of compliance with the standard and the comparability of segment information reported by intermediate-size European companies. Our findings reveal a lower level of compliance than that observed in previous studies on samples of multinationals. The intermediate-size European companies in our sample use fewer segments and provide less information per segment, without however neglecting voluntary disclosures. Some significant differences emerge between companies depending on their country of domicile and their economic sector.

Keywords: segment information, IFRS 8, intermediate-size company, compliance

1. Introduction

When the IASB published the IFRS 8 *Operating Segments* standard in November 2006, many criticisms were levelled against the standard setter's decision, especially in Europe. Largely based on the American SFAS 131, this new standard broke with the approach that had been followed in the previous standard (IAS 14) and caused some people to fear a decline in the quality of segment information reported. Yet given the diversification and internationalisation of companies, segment information is essential for users of financial information (Day 1986 ; Previts, Bricker, Robinson, & Young,1994) . Favouring the managerial approach based on internal reporting in order to reduce costs, to shorten reporting times, and to optimise information quality and relevance to users, the IFRS 8 standard tends to disregard geographic information somewhat and moves away from the former IAS 14 standard on certain points. In a historically unusual step in the EU process of adopting IFRS standards, the European Parliament asked the European Commission to carry out a study of the potential impact of the standard before ruling on its adoption – in spite of the endorsement by EFRAG and ARC. The standard was finally adopted by the Commission a few months later on the condition that it presents a follow-up report to Parliament. This was also the first standard to be subjected to a post-implementation review conducted by the IASB. This step was introduced into the IASB's formal consultation process (due process) in 2008 and in principle is limited to major or disputed standards and amendments.

The purpose of our study is to contribute to the current debate on the effects of the implementation of IFRS 8. Our review of the literature shows that the few studies that have so far been conducted on this topic tend to focus on large, listed companies and do not pay much attention to any differences in practices that may exist between companies depending on their country of domicile. We have therefore decided to focus on IFRS 8 implementation by European "intermediate-size" listed companies (defined below). Our study examines a sample of 197 intermediate-size listed companies in Germany, France, the UK and Italy for which we have manually collected data on segment information published in their 2010 annual report. The main objective of our study is to better understand how European intermediate-sized companies apply the IFRS 8 standard.

The first part of this paper briefly outlines the requirements of the IFRS 8 standard for disclosing segment information. Our review of the literature and research questions are developed in the second part. The third part describes our research methodology. Our findings are presented and discussed in the fourth part.

2. Segment Information under IFRS

The IFRS 8 standard, which came into effect on 1 January 2009, requires companies to adopt a managerial approach in disclosing segment data. This managerial approach means that they have to provide information the way it is used by the chief operating decision maker (CODM). This information does not necessarily conform to the requirements of other IFRS standards, which was not the case of IAS 14 which required segment information to be prepared in accordance with the accounting principles and methods used in preparing financial statements. The managerial approach is generally deemed to be more suitable because it is based on the information as it is "seen" and "used" by managers. Most financial analysts appreciate having information that is identical to that used by chief executives, but they fear that companies will change their segmentation more often, making financial statements less comparable (CFA-Institute 2007; Papa & Ciesielski 2009). Apart from choosing the managerial approach, which was the most important issue in the debate on moving to a new standard, other elements were also modified in the new standard. For example, the amount of compulsory information to be reported was substantially reduced, with several items only being reported if they are actually provided to the CODM. The segment information required by IFRS 8 is presented in Table 1.

Table 1. Items required under IFRS 8

Mandatory general information : - Explanation on segmentation : factors used to identify the entity's reportable segments - Types of products and services from which each reportable segment derives its revenues
Mandatory items (for each segment) - Measure of profit or loss - Segment assets, if regularly provided to chief operating decision maker - Segment liabilities, if regularly provided to chief operating decision maker
Items to be disclosed if they are included in the measure of segment profit/loss reviewed by chief operating decision maker, or otherwise regularly provided to the chief operating decision maker, even if not included in that measure of segment profit/loss. - Revenue from external customers - Revenues from transactions with other operating segments of the same entity - Interest revenue - Interest expense - Depreciation and amortisation - Equity method income - Income tax expense/benefit - Material non-cash items other than depreciation and amortisation - Other material items
Balance sheet information to be disclosed if it is included in the measure of segment assets reviewed by chief operating decision maker, or otherwise regularly provided to the chief operating decision maker, even if not included in that measure of segment assets. - Equity method investments - Additions to non-current assets
Reconciliation of consolidated data with : - Segment revenues - Segment measures of profit or loss - Segment assets (if they are disclosed) - Segment liabilities (if they are disclosed) - Other material items disclosed
Entity-wide disclosures: information to be disclosed if it is available and not already provided as a part of segment information - ***Information about products and services :*** • Revenues from external customers for each product or service - ***Information about geographical areas*** • Revenues from external customers (i) attributed to the entity's country of domicile and (ii) attributed to all foreign countries in total from which the entity derives revenues • Non-current assets (i) located in the entity's country of domicile and (ii) located in all foreign countries in total in which the entity holds assets - ***Information about major customers :*** • If revenues from transactions with a single external customer amount to 10% or more of an entity's revenues, the entity shall disclose that fact

The number of items that must necessarily be reported is very limited and, surprisingly, revenue from ordinary activities (turnover) is not among them. It is hard to imagine turnover not being included in the calculation of a segment's results, nor provided to the CODM. Even though not compulsory, this figure should be reported systematically.

3. Literature Review and Research Questions

The aim of our research is to make a survey of the segment information reporting practices of Intermediate-size European listed companies and analyse whether the information published complies with the requirements of IFRS 8. Numerous studies have been conducted on segment information and they may be grouped in three categories. The first contains studies that seek to identify the determinants of voluntary disclosure of segment data. The second covers research into the usefulness of segment information. The third category, which our literature review focuses on, contains studies that analyse in detail the segment information reported by companies. One set of studies examines the comparability of segment information reported, while another looks into the evolution of this information following the introduction of a new standard. Finally, we present the few studies that exist on the compliance of information reported with the requirements of the accounting standard in force at the time.

3.1 Comparability of Segment Information Reported by Companies

The first studies on segment information focused on comparing the practices of firms located in the same country and concluded that the segment information reported was weakly homogeneous (Pacter 1970 ; Emmanuel & Gray, 1977 ; Tyson & Jacobs, 1987).

Other studies compare segment information reported by firms located in different countries and highlight national specificities, but all of them were carried out before the application of IFRS, when the accounting standards were different, depending on the country (Gray & Radebaugh, 1984, Herrmann & Thomas, 1996). To our knowledge, there has never been a study on the comparability of segment information reported by firms from different countries where all of them use the IFRS standard. A KPMG study (2010), based on a sample of 81 companies chosen at random from the largest 500 companies worldwide, reveals segment disparities in the implementation of IFRS 8. It shows that 66% of the firms in the sample perform a segmentation by product or service, but that there are disparities depending on the type of activity. For example, the majority of agri-food companies (80%) prefer geographic segmentation, while all the transport companies chose segmentation by product.

3.2 Introduction of a New Standard and Segment Information Reported

The first studies were carried out in an American business context, when the FASB adopted the SFAS 131 standard in 1997 to replace SFAS 14. Herrmann and Thomas (2000) observed that changing the definition of what constitutes a segment (shifting to an "operational" definition based on internal reporting) caused 68% of the companies in the sample to alter their segmentation. The impact of the shift to a managerial approach was therefore quite real. The number of segments reported tends to increase, as does the number of items while the amount of geographic information declines. Street, Nichols and Gray (2000) also observe an improvement in segment reporting (greater number of segments and more information published) for the largest American firms after adoption of the SFAS 131 standard. Thinner geographic information is also observed (steep decline in the disclosure rate of earnings by geographic area. On the contrary, Doupnik and Seese (2001) observe an improvement in the granularity (mainly the segmentation by country) of geographic information reported under the new SFAS 131 standard.

The first studies on the effects of the shift from IAS 14 to IFRS 8 appeared in 2012. Nichols, Street and Cereola (2012) studied the impact of the adoption of IFRS 8 on the segment information reported by 335 large European multinationals.[1] For the majority of firms, they observe that while the number of segments had not changed with the shift to IFRS 8, the number of segment items reported dropped significantly. However, they observe an improvement in the granularity of the geographic data reported, contrary to what critics of IFRS 8 feared. Crawford, Extance and Helliar (2012) analyse the segment information reported by 151 British firms before and after adopting IFRS 8. Their findings are similar to those of Nichols et al. (2012): the number of segments reported rose slightly, but the number of items reported per segment dropped. Two studies carried out in

[1]Their sample was made up of companies in the top third of the market index of 14 European countries: Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Norway, Spain, Sweden and Switzerland.

Australia obtained findings that differed somewhat from these. Kang and Gray (2012) and Bugeja, Czernkowski and Bowen (2012) observe an increase in both the number of segments and the number of items reported. In a study on the impact of the new standard on Italian firms, Pisano and Landriana (2012) pointed out that the companies operating in sectors with less competition reduced the amount of segment data reported.

3.3 Conformity of the Information Reported with the IFRS Standard

There are still very few studies that look at compliance with IFRS reporting requirements and most of them were carried out before 2001, i.e. before the IASB was founded, when IAS/IFRS were voluntarily adopted (Chatham, 2008 ; Street & Gray,2002 ; Street & Bryant, 2000).

Few studies look at the compliance of financial information reported by companies that are obliged to apply the IFRS standard. Based on a sample of 101 firms, Mechelli (2009) examines the extent to which Italian companies comply with the requirements of IAS 7 *Cash flow statements* during the first year IFRS standards were applied. He concludes that compliance is low for Italian firms. Nichols et al. (2012) do not analyse the extent to which European multinationals comply with the IFRS standard, but their study provides data on the frequency of reporting for the different items required by IFRS 8.

3.4 Research Questions

Our study of the segment information reporting behaviour of Intermediate-size European listed companies is based on the following research questions:

1. What are the practices of intermediate-size companies in the area of segmentation?

1a. What is the preferred segmentation approach (by line of business, by geographic area, or a mixed approach)?

1b. How many segments are reported?

2. To what extent do intermediate-size companies comply with the requirements of the IFRS 8 standard?

3. What segment information is voluntarily reported by intermediate-size companies?

4. How many companies are early adopters of IFRS 8?

5. Are there any differences between German, French, Italian, and British companies in terms of segment information reporting?

6. Are there any differences in segment information reporting behaviour related to type of business activity?

4. Methodology

In setting up our sample we have used the official French definition of an intermediate-size company as specified by the 2008 French finance law[2]: a company with between 250 and 4 999 employees, turnover not exceeding €1.5 billion and a balance sheet total not exceeding €2 billion.

As data had to be collected manually, with two annual reports (2009 and 2010) per company, we decided to limit the number of firms to 300 at first in order to obtain our first results within a reasonable amount of time. We therefore decided to select companies from four European countries: the UK, France, Germany and Italy, first because their stock exchanges are among the largest in Europe and, second, to reflect the geographic diversity of the research team. Our initial selection of British, French, German and Italian intermediate-size companies was based on 2010 data from the Thomson ONE Banker database. Table 2 summarises the procedure for setting up the sample.

Table 2. Sample design

French, German, British and Italian small and mid- caps for which net sales are < 1.5 billion euros		1,510
Entities for which some items are missing	-98	1,412
Financial entities	-210	1,202
Companies for which the number of employees is less than 250 or more than 4,999	-297	905
Companies for which the total assets is more than 2 billion euros	-16	889
Manually eliminated companies (as described in the paper)	-602	287
Companies with one or two missing annual reports	-46	241
Italian companies not analysed	-26	215
Single segment companies	-18	**197**

Our initial sample was made up of 889 companies. In order to meet our starting objective of 300 companies, we manually reduced the sample using the following criteria:

[2]French law n° 2008-776 on the modernisation of the economy, promulgated on 4 August 2008.

- ruling out companies for which we could not get access to at least five studies by financial analysts[3] working at brokerage firms for the 2007-2011 period in the Thomson One Banker database;
- randomly choosing one company out of three, making sure that the proportion of countries and other criteria (number of employees, turnover and balance sheet total) was virtually identical to the original selection.

We thus obtained a sample made up of 287 intermediate-size European listed companies. Finally, we eliminated companies for which we did not have two annual reports, 26 Italian companies that did not publish their annual report in English, and 18 mono-segment companies. The latter do not publish specific segment information either because they only have one line of business or because they only operate in one geographic area. Taking them into account would have biased our analysis of compliance with IFRS 8. The final sample was made up of 197 companies. Data enabling us to answer our research questions was then collected manually from the 2010 annual reports[4] of these 197 companies. T-tests were done to show statistically significant variances in means.

5. Findings

5.1 Description of the Sample

At this stage in our research Italian companies are the least represented because in our sample (table 3), as explained above, those that do not publish an English version of their annual report were excluded from our sample. Companies were classified in five groups according to their GICS code (Global Industry Classification Standard). As shown in Table 4, the telecommunications and information technologies sector is the most represented with 68 companies (34% of the sample), followed by industrials (27% of the sample). The average turnover of companies in the sample is €273 million, their average balance sheet total is €312 million and the average number of employees is 1456.

5.2 Segmentation

5.2.1 Type of Segmentation

We identified three types of approach used by the companies in our sample for presenting segments: by line of business (LOB), by geographic area and matrix.[5] Table 3 shows that a large majority of companies (70%) choose a segmentation by LOB. This finding is in keeping with previous studies. An LOB segmentation was chosen by 75%[6] of companies in the Nichols et al. (2012) sample and 66% of those in the KPMG study (2010). In our sample of intermediate-size companies, the French companies differed slightly from the others in that they used an LOB segmentation less frequently (64%)[7] while in the Nichols et al. (2012) sample German companies differed most from the others (87% of the 30 German companies chose this type of segmentation).

Table 3. Type of segmentation by country

	LOB Segmentation		GEO. Segmentation		Matrix Segmentation		***Total***	
	N	**%**	**N**	**%**	**N**	**%**	***N***	***%***
Germany	41	73%	15	27%	-	-	*56*	*100%*
France	32	64%	15	30%	3	6%	*50*	*100%*
UK	49	70%	18	26%	3	4%	*70*	*100%*
Italy	15	71%	5	24%	1	5%	*21*	*100%*
Total	***137***	***70%***	***53***	***27%***	***7***	***4%***	***197***	***100%***

[3]Reports by financial analysts will be used in future research

[4]All annual reports with a closing date in 2010 are considered as 2010 annual reports.

[5]Readers interested in an exhaustive presentation of the different segmentations will find many explanations and illustrations based on real cases from European blue chips in the article by Nichols et al. (2012).

[6]On a basis comparable to our classification, i.e. after removing companies that only report one segment in Nichols et al. (2012), we obtain 73% after grouping together the companies listed in the two "matrix" columns and 77 % after grouping together the companies listed in the two "mixed" columns.

[7]Mainly because three intermediate-size French companies adopt a matrix segmentation (whereas no German or French company does so in the sample of Nichols et al. (2012).

Table 4. Type of segmentation by sector

	LOB Segmentation		GEO. Segmentation		Matrix Segmentation		***Total***	
	N	**%**	**N**	**%**	**N**	**%**	***N***	***%***
Consumer G&S	30	77%	7	18%	2	5%	*39*	*100%*
Energies et Matières Premières	18	78%	5	22%	-	-	*23*	*100%*
Health Care Care	7	50%	7	50%	-	-	*14*	*100%*
Industrials	34	64%	16	30%	3	6%	*53*	*100%*
Information Tech. & Telecom	48	71%	18	26%	2	3%	*68*	*100%*
Total	***137***	***70%***	***53***	***27%***	*7*	***4%***	***197***	***100%***

Table 4 shows that there are disparities in the segmentation chosen depending on the sector, a finding which has already been highlighted in recent studies (KPMG 2010). For example, in our sample, a segmentation by LOB is much less frequent in the health care and industrials sectors, with geographic segmentation accounting for 50% and 30% respectively of the companies in these two sectors, while the average for the sample as a whole is 27%. It should be pointed out however that it is very hard to compare the choice of segmentation at the economic sector level (industry, services, etc.) for the various studies published recently given that codifications and groupings carried out by researchers are not identical.

The third type of segmentation is a combination of geographic segments and product/services/business lines called a "matrix" segmentation. It is only adopted by a small minority (4%) of companies. No German company and no company in the energy and materials or health care sectors chose it.

In sum, based on our sample, intermediate-size companies appear to have adopted the same behaviour as the largest European companies by mostly choosing LOB segmentation.

5.2.2 Number of Segments and Number of Items per Segment

The number of segments reported as well as the number of items provided for each segment is frequently used to determine the quality of segment reporting and its comparability. The adoption of a new standard on segment reporting is a good reason to look at these two indicators.

Still, the various studies in this area lack uniformity of methodology. First of all, it is important to distinguish the operating segments defined by the standard from the different categories reported by firms. Companies often publish one or two columns that correspond to reconciling items or to "corporate" data or even to discontinued activities. In our study we only use "pure" operating segments and have therefore discarded any reconciling "columns". Second, the studies either present averages for their entire sample (total number of segments divided by the number of firms in the sample), or averages by segment type only for companies using that type of segmentation. We feel the second approach is sounder and provides a more accurate image of company practices.

Table 5 presents the number of segments reported depending on the type of segmentation chosen (a firm may report information in both LOB and geographic segmentations, whether in matrix or otherwise). We observe that the number of segments used by firms presenting an LOB segmentation is smaller than the number of segments used by firms presenting a geographic segmentation (3.2 vs. 3.82). For the sample as a whole, however, firms report less geographic information than information based on LOB segmentation.

Unsurprisingly, we observe that companies tend to favour their primary segmentation. Thus firms opting for a LOB segmentation report 3.15 operating segments on average with more than 11 items of information per segment, but they report 4.09 geographic segments with fewer than 2 items per segment. Companies opting for a geographic operating segmentation report 3.45 segments on average with 9.79 items per geographic segment compared with 3.60 segments and 1 item of information for their LOB segmentation. In both cases, the information provided in the "secondary segmentation" is often limited to turnover or perhaps an earnings indicator and the segments are few in number.

The recent study by Crawford et al. (2012) shows a smaller number of segments for small companies (FTSE 250 vs FTSE 100), regardless of whether the segmentation is LOB or geographic. Our findings were lower than those obtained by Crawford et al. (2012) for their sample as a whole, unless we compare the number of LOB operating segments for FTSE 250 companies (2.75). For Nichols et al. (2012) the average number of operating segments (regardless of segmentation type) is 4.19. The intermediate-size companies in our sample thus report a smaller number of segments, whether LOB or geographic, than has been observed in studies on larger companies.

Table 5. Number of segments and number of items by segmentation type chosen to define operating segments

Type Of Operating Segmentation		LOB Segmentation: Number of Segments	LOB Segmentation: Number of Items per Segment	GEO. Segmentation: Number of Segments	GEO. Segmentation: Number of Items per Segment
Total	***N***	***163***	***163***	***154***	***154***
	Mean	***3.20***	***8.83***	***3.82***	***4.30***
	Max.	***8.00***	***73***	***11.00***	***44***
LOB (N=137)	*N*	*137*	*137*	*94*	*94*
	Mean	3.15	11.64	4.09	1.93
	Max.	8.00	73	11.00	19
GEO (N=53)	*N*	*20*	*20*	*53*	*53*
	Mean	3.60	1.13	3.45	9.79
	Max.	7.00	15	7.00	44
Matrix (N=7)	*N*	*6*	*6*	*7*	*7*
	Mean	3.00	12.00	3.00	9.29
	Max.	6.00	51	4.00	18

The analysis of the number of segments and the number of items per segment by country (Table 6) allows us to identify potential differences in practices by country. German firms are slightly above the overall sample average except for the number of geographic items reported (statistically significant negative difference). The intermediate-size French companies use fewer segments on average, but report slightly more items per segment. They distinguish information concerning the country of domicile (France) less frequently and this is statistically significant. Overall and on average, British firms provide fewer LOB segment items. Finally, Italian firms tend to use a greater number of geographic segments.

Table 6. Number of segments and items by country

Country		LOB Segmentation: Number of Segments	LOB Segmentation: Number of Items per Segment	GEO. Segmentation: Number of Segments	GEO. Segmentation: Number of Items per Segment
Total	***N***	***163***	***163***	***154***	***154***
	Mean	***3.20***	***8.83***	***3.82***	***4.30***
	Max.	***8***	***73***	***11***	***44***
Germany (N=56)	***N***	*52*	*52*	*50*	*50*
	Mean	3.29	8.95	3.70	3.11 (-)
	Max.	8	28	11	13
France (N=50)	*N*	*37*	*37*	*32*	*32*
	Mean	3.35	10.62	3.56	6.02
	Max.	7	73	7	44
UK (N=70)	*N*	*58*	*58*	*54*	*54*
	Mean	3.05	7.24 (-)	3.65	3.90
	Max.	7	21	8	22
Italy (N=21)	*N*	*16*	*16*	*18*	*18*
	Mean	3.06	9.52	5.11 (+)	4.76
	Max.	5	33	11	14

(+) or (-) : Indicates a significant positive or negative difference in mean in comparison with other countries (t-test, confidence 95%)

Table 7 presents the number of segments and items per segment by sector for the firms in the sample. We do not observe any significant differences in the findings obtained for each sector. However, we observe that firms in the health care sector report more items per segment and use more segments in the geographic segmentation than firms in other sectors.

Table 7. Number of segments and items per segment by sector

Industry Sectors		LOB Segmentation: Number of Segments	LOB Segmentation: Number of Items per Segment	GEO. Segmentation: Number of Segments	GEO. Segmentation: Number of Items per Segment
Total	***N***	***163***	***163***	***154***	***154***
	Mean	***3.20***	***8.83***	***3.82***	***4.30***
	Max.	***8***	***73***	***11***	***44***
Consumer G&S (N=39)	*N*	*34*	*34*	*24*	*24*
	Mean	3.09	7.33	3.92	3.64
	Max.	8	21	11	38
Energy & Materials (N=23)	*N*	*19*	*19*	*21*	*21*
	Mean	3.42	10.52	4.05	4.30
	Max.	7	28	8	22
Health Care Care (N=14)	*N*	*9*	*9*	*13*	*13*
	Mean	3.00	5.36	4.46	5.36
	Max.	5	16	11	23
Industrials (N=53)	*N*	*45*	*45*	*41*	*41*
	Mean	3.31	8.91	3.59	4.45
	Max.	6	51	6	19
Information Tech. & Telecom (N=68)	*N*	*56*	*56*	*55*	*55*
	Mean	3.13	9.76	3.71	4.35
	Max.	7	73	8	44

5.3 Compliance with IFRS 8

We measured compliance with the standard by observing whether the information required or suggested by IFRS 8 was provided by each company in the appendices of their annual report. We did not try to calculate a compliance index. Our findings therefore concern the number and percentage of companies that report the information. In this way we have determined a disclosure rate for each item of information.

Like previous studies on IFRS 8, we are able to study the overall compliance with the standard. We decided to take our analysis of compliance even further by detailing certain factors: the type of segmentation chosen, the country of domicile and the economic sector.

5.3.1 Overall Compliance

Overall, compliance by the firms in our sample (table 8) is inferior to the findings obtained by Nichols et al. (2012) for a sample of large international companies and is closer to the findings presented by Crawford et al. (2012) on firms in the UK. Virtually all of the companies (195 out of 197) report ordinary revenues from external customers. This result is close to that (100%) obtained by Nichols et al. (2012) for a sample of large European multinationals (blue chip companies – BCC), but higher than the 91% rate found by Crawford et al. (2012) for a sample of 150 British firms – FTSE 250. Concerning the first level of information required by IFRS, the level of compliance by companies in our sample is relatively mediocre. Nearly a third of the companies (29%) do not provide any explanation of the segmentation adopted. The profit or loss indicator is disclosed in 84% of the cases (100% of the cases for BCC and 89% for FTSE 250 companies). The total assets indicator is disclosed in 73% of the cases, that of total liabilities in only 58% of the cases. This tendency to disclose less information about liabilities is also found in our sample made up of smaller firms.

Apart from data on ordinary revenues from external customers, income statement items required by IFRS 8 under certain conditions are seldom disclosed by the companies in our sample. For example, amortisations are only reported in 69% of the cases, which is relatively low compared with the findings obtained from the BCC and FTSE 250 samples. Additional information relating to balance sheet items is also rarely disclosed: 48% of the companies report the value of segment investments (CAPEX) and only 4% report the value of equity method investments. The leeway allowed by the standard as well as the smaller size of companies studied may help to explain these low disclosure percentages. Either these items were not used by the CODM or they were not included in the calculation of the profit or loss indicator or, finally they were not significant or even included in the firm's reporting.

There is little disclosure of entity-wide information or additional geographic data. We also observe infrequent reporting of the value of non-current geographic segment assets. Some companies maintain secondary segmentation indicators from the earlier IAS14 standard, such as reporting total assets (32%) or the value of segment investments according to a secondary segmentation (16%). Further, some companies still report exceptional items even though the IFRS does not call for them.

Finally, most of the companies in the sample report the principle reconciliations (revenues and earnings) while reconciliations of assets and liabilities are less frequently reported.

Table 8. Compliance with IFRS 8

	N	% (N=197)	*Results from Nichols et al. (2012) N=306*	*Results from Crawford et al. (2012) N=150*
Information required under IFRS 8				
Explanation of the segmentation	**140**	**71%**		
Measure of profit or loss	**166**	**84%**	*100%*	*89%*
Total assets	**144**	**73%**	*93%*	*83%*
Total liabilities	**115**	**58%**	*71%*	*60%*
P&L information required under IFRS 8 (if certain conditions met)				
Revenues from external customers	**195**	**99%**	*100%*	*91%*
Intersegment revenues	**105**	**53%**	*54%*	*41%*
Interest revenue	**30**	**15%**	*23%*	*13%*
Interest expense	**30**	**15%**	*14%*	*12%*
Depreciation and amortisation	**136**	**69%**	*86%*	*80%*
Interest in the profit or loss of associates and JV	**18**	**9%**	*30%*	*39%*
Income tax expense or income	**26**	**13%**	*20%*	*8%*
Material non-cash items other than depreciation and amortisation	**23**	**12%**	*56%*	*49%*
Balance sheet information required under IFRS 8 if certain conditions met				
Investment in associates and JV	**8**	**4%**	*30%*	*31%*
Additions to non-current assets (CAPEX)	**94**	**48%**	*73%*	*77%*
Entity-Wide disclosures				
Revenues from external customers (LOB and/or Geo)	**107**	**54%**		*80% (Prod)* *85% (Géo.)*
Non-current assets- GEO. Segmentation	**62**	**31%**		*53%*
Information about major customers	**63**	**32%**		*21%*
Other information (non required under IFRS 8)				
Total Assets (second segmentation)	**63**	**32%**		*17%*
Additions to non-current assets (CAPEX) - Geo. Segmentation	**31**	**16%**		*14%*
Information related to IAS 36	**30**	**15%**		
Financial result	**17**	**9%**		
Exceptional items	**8**	**4%**	*2%*	
Reconciliations required under IFRS 8				
Reconciliation of the revenues	**162**	**82%**		*85%*
Reconciliation of the measures of profit or loss	**143**	**73%**		*72%*
Reconciliation of the total assets	**128**	**65%**		*79%*
Reconciliation of the total liabilities	**104**	**53%**		*59%*

5.3.2 Compliance with IFRS 8 by Type of Segmentation Chosen

At the time of its adoption, IAS 14 ensured that a minimum of geographic segment information was reported. The adoption of IFRS 8 has raised concerns that there will be a decline in disclosure of this information. We have therefore tried to compare compliance with IFRS 8 depending on the type of segmentation used to define the company's operating segments. We have distinguished between a segmentation based on products and services, (LOB segmentation), a segmentation based on geographic sectors (geographic segmentation), and a matrix segmentation based on both LOB and geographic segments (table 9).

We observe that there is no significant difference (t-test of means) between the two main types of segmentation chosen (LOB or geographic), except in the area of "secondary segmentation" information. The firms that choose an LOB segmentation tend to disclose less geographic information on ordinary revenue from external customers, total assets and the CAPEX. The firms whose segmentation is based on geographic segments disclose these items more frequently in a secondary segmentation (LOB).

Table 9. Compliance with IFRS 8 by type of segmentation

	LOB Segmentation (N=137)	GEO. Segmentation (N=53)	Matrix Segmentation (N=7)	***Total (N=197)***	**Mean Difference**	**Sig (1)**
	Mean	Mean	Mean	***Mean***	LOB vs GEO	
Information required under IFRS 8						
Explanation of the segmentation	75%	60%	71%	***71%***	0.15	
Measure of profit or loss	85%	81%	86%	***84%***	0.04	
Total assets	72%	75%	71%	***73%***	(0.03)	
Total liabilities	56%	62%	71%	***58%***	(0.06)	
P&L information required under IFRS 8 (if certain conditions met)						
Revenues from external customers	99%	100%	100%	***99%***	(0.01)	
Intersegment revenues	53%	53%	57%	***53%***	0.00	
Interest revenue	15%	15%	14%	***15%***	0.00	
Interest expense	15%	17%	0%	***15%***	(0.02)	
Depreciation and amortisation	70%	68%	57%	***69%***	0.02	
Interest in the profit or loss of associates and JV	11%	4%	14%	***9%***	0.07	
Income tax expense or income	13%	13%	14%	***13%***	(0.00)	
Material non-cash items other than depreciation and amortisation	12%	13%	0%	***12%***	(0.02)	
Balance sheet information required under IFRS 8 if certain conditions met						
Investment in associates and JV	4%	6%	0%	***4%***	(0.02)	
Additions to non-current assets (CAPEX)	53%	38%	29%	***48%***	0.15	
Entity-Wide disclosures						
Revenues from external customers (LOB and/or Geo)	47%	74%	43%	***54%***	**(0.26)**	*
Non-current assets- GEO. Segmentation	34%	25%	29%	***31%***	0.10	
Information about major customers	31%	36%	29%	***32%***	(0.05)	
Other information (non required under IFRS 8)						
Total Assets (second segmentation)	21%	60%	29%	***32%***	**(0.39)**	*
Additions to non-current assets (CAPEX) - Geo. Segmentation	12%	26%	0%	***16%***	**(0.14)**	*
Information related to IAS 36	17%	13%	0%	***15%***	0.04	
Financial result	9%	6%	29%	***9%***	0.03	
Exceptionalitems	3%	6%	14%	***4%***	(0.03)	
Reconciliations required under IFRS 8						
Reconciliation of the revenues	81%	87%	71%	***82%***	(0.06)	
Reconciliation of the measures of profit or loss	73%	74%	57%	***73%***	(0.01)	
Reconciliation of the total assets	64%	68%	57%	***65%***	(0.04)	
Reconciliation of the total liabilities	52%	55%	57%	***53%***	(0.03)	

T-Test ; 95% confidence level

5.3.3 Compliance with IFRS 8 by Country of Domicile

An examination of compliance with the standard depending on companies' country of domicile sheds new light on the question. To our knowledge, no other study compares compliance with IFRS 8 by country of domicile. Table 10 presents the rate of compliance for each item by companies in each of the four countries studied and indicates whether this rate is significantly higher (+) or lower (-) than the average for all the other countries.

Italian firms are generally situated in the middle of the sample; they only score below firms in other countries on the disclosure of information on their main customers.

UK firms report significantly richer segment information on total assets and liabilities (indicator and reconciliation) as well as better information on the value of segment investments. Overall, their disclosure rate is often higher than the average of other firms in the sample. However, we observe rates that are generally lower than those obtained by Crawford et al. (2012) for the British companies in their sample. This may be due to an effect linked to the size of the companies, which the Crawford et al. (2012) study seems to confirm. Indeed, they observe that the disclosure rate of FTSE 250 companies is lower than that of the larger FTSE 100 companies.

For many of the items, German companies have a higher rate of disclosure than companies in the other countries, except on total assets and liabilities (indicator and reconciliation).

Finally, French companies often have lower than average disclosure rates, especially on the value of segment CAPEX, information on main customers and the value of depreciations.

Table 10. Compliance with IFRS 8 by country of domicile

	Germany (N=56)		France (N=50)		UK (N=70)		Italy (N=21)		***Total (N=197)***
	Mean	Sig.	Mean	Sig.	Mean	Sig.	Mean	Sig.	***Mean***
Information required under IFRS 8									
Explanation of the segmentation	88%	(+)	50%	(-)	70%		81%		***71%***
Measure of profit or loss	80%		82%		87%		90%		***84%***
Total assets	63%	(-)	64%		84%	(+)	86%		***73%***
Total liabilities	46%	(-)	52%		71%	(+)	62%		***58%***
P&L information required under IFRS 8 (if certain conditions met)									
Revenues from external customers	100%		98%		99%		100%		***99%***
Intersegment revenues	73%	(+)	34%	(-)	50%		57%		***53%***
Interest revenue	23%		18%		9%	(-)	10%		***15%***
Interest expense	25%	(+)	16%		9%	(-)	10%		***15%***
Depreciation and amortisation	75%		54%	(-)	77%		62%		***69%***
Interest in the profit or loss of associates and JV	11%		16%		1%	(-)	14%		***9%***
Income tax expense or income	13%		26%	(+)	9%		0%	(-)	***13%***
Material non-cash items other than depreciation and amortisation	23%	(+)	6%		9%		5%		***12%***
Balance sheet information required under IFRS 8 if certain conditions met									
Investment in associates and JV	2%		6%		0%	(-)	19%		***4%***
Additions to non-current assets (CAPEX)	46%		24%	(-)	64%	(+)	52%		***48%***
Entity-Wide disclosures									
Revenues from external customers (LOB and/or Geo)	55%		46%		56%		67%		***54%***
Non-current assets- GEO. Segmentation	36%		26%		31%		33%		***31%***
Information about major customers	54%	(+)	16%	(-)	31%		14%	(-)	***32%***
Other information (non required under IFRS 8)									
Total Assets (second segmentation)	30%		26%		33%		48%		***32%***
Additions to non-current assets (CAPEX) - Geo. Segmentation	18%		8%	(-)	16%		29%		***16%***
Information related to IAS 36	20%		16%		13%		10%		***15%***
Financial result	9%		12%		6%		10%		***9%***
Exceptional items	2%		0%	(-)	10%	(+)	0%	(-)	***4%***
Reconciliations required under IFRS 8									
Reconciliation of the revenues	86%		86%		77%		81%		***82%***
Reconciliation of the measures of profit or loss	66%		72%		77%		76%		***73%***
Reconciliation of the total assets	52%	(-)	56%		77%	(+)	81%		***65%***
Reconciliation of the total liabilities	41%	(-)	48%		63%	(+)	62%		***53%***

(+) or (-) : Indicates a significant positive or negative difference in mean in comparison with other countries (t-test, confidence 95%)

5.3.4 Compliance with IFRS 8 by Sector

Table 11 presents the rate of compliance for each item by companies in each of the five sectors studied and indicates whether this rate is significantly higher (+) or lower (-) than the average for all the other sectors. Only the energy and materials sector has a certain number of significant differences on key information. Significant differences are much less numerous for other sectors and only concern a few points.

In general, companies in the energy and materials sector have a slightly higher disclosure rate than the other companies in the sample, especially on key information: explanation of segmentation, profit or loss indicator, segment assets, amortisations, and above all the value of CAPEX. This may be explained by a higher capital intensity companies in the other sectors disclose total assets more than the value of non-current assets in a secondary segmentation. Companies in the consumer goods and services sector mainly underdisclose the amount of segment depreciations. The disclosure rate for non-current asset acquisitions is lower than for firms in the health care sector and is lower than the average, though not significantly, for the same firms for geographic-based reporting. Companies in the industrials sector reveal a lower disclosure rate than that of the other companies in the area of sales data (entity-wide ordinary revenues from external customers and data on main customers). This sector tends to report overall financial results rather than give a detailed breakdown. Finally, companies in the information technology and telecommunications sector essentially stand out for their less frequent reporting of inter-segment revenues.

Table 11. Compliance with IFRS 8 by sector

	Consumer G&S (N=39)	Energy & Materials (N=23)	Health Care (N=14)	Industrials (N=53)	Information Tech. & Telecom (N=68)	***Total (N=197)***
	Mean (Sig)	Mean (Sig)	Mean (Sig)	Mean (Sig)	Mean (Sig)	***Mean***
Information required under IFRS 8						
Explanation of the segmentation	74%	87% (+)	64%	62%	72%	***71%***
Measure of profit or loss	74%	96% (+)	79%	89%	84%	***84%***
Total assets	69%	91% (+)	64%	77%	68%	***73%***
Total liabilities	49%	57%	64%	66%	57%	***58%***
P&L information required under IFRS 8 (if certain conditions met)						
Revenues from external customers	97%	100%	100%	98%	100%	***99%***
Intersegment revenues	49%	74% (+)	57%	60%	43% (-)	***53%***
Interest revenue	21%	30%	21%	6% (-)	13%	***15%***
Interest expense	21%	26%	21%	9%	12%	***15%***
Depreciation and amortisation	54% (-)	91% (+)	57%	79%	65%	***69%***
Interest in the profit or loss of associates and JV	8%	22%	0% (-)	6%	10%	***9%***
Income tax expense or income	15%	13%	21%	11%	12%	***13%***
Material non-cash items other than depreciation and amortisation	13%	13%	21%	9%	10%	***12%***
Balance sheet information required under IFRS 8 if certain conditions met						
Investment in associates and JV	3%	9%	0%	4%	4%	***4%***
Additions to non-current assets (CAPEX)	44%	70% (+)	21% (-)	58%	40%	***48%***
Entity-Wide disclosures						
Revenues from external customers (LOB and/or Geo)	54%	61%	57%	42% (-)	62%	***54%***
Non-current assets- GEO. Segmentation	26%	48%	29%	26%	34%	***31%***
Information about major customers	23%	43%	43%	21% (-)	40%	***32%***
Other information (non required under IFRS 8)						
Total Assets (second segmentation)	36%	22%	43%	28%	34%	***32%***
Additions to non-current assets (CAPEX) - Geo. Segmentation	18%	9%	7%	21%	15%	***16%***
Information related to IAS 36	5% (-)	13%	14%	15%	22%	***15%***
Financial result	3% (-)	4%	7%	21% (+)	4%	***9%***
Exceptionel items	5%	9%	0%	4%	3%	***4%***
Reconciliations required under IFRS 8						
Reconciliation of the revenues	90%	91%	71%	81%	78%	***82%***
Reconciliation of the measures of profit or loss	77%	87% (+)	64%	72%	68%	***73%***
Reconciliation of the total assets	67%	74%	57%	70%	59%	***65%***
Reconciliation of the total liabilities	49%	48%	57%	58%	51%	***53%***

(+) or (-) : Indicates a significant positive or negative difference in mean in comparison with other industry sectors (t-test, confidence 95%)

5.4 Voluntary and/or Detailed Segment Information

Companies may decide to provide more segment information than required by the accounting standard; we call this voluntary segment information. Further, some information required by the standard is not standardised and may call for the company's own indicators to be reported either because of the way they are defined or calculated. In this part of our study we examine voluntary segment information and non-standardised indicators.

5.4.1 Voluntary Segment Information: Overall Findings

The companies in our sample tend to provide extra segment details on revenues (38% of the companies in the sample) and/or costs (48%). This finding is quite remarkable, especially in comparison with the findings of Nichols et al. (2012) who show a 28% disclosure rate for detailed income statement information in the main segmentation and 2% in the secondary geographic segmentation.

The income indicators used by companies in the sample may be multiple. Firms mainly report EBIT (69% of cases), a specific indicator such as operating profit or a particular profit metric (36%), EBITDA (22%) or net income (18%). In comparison with the findings obtained by Nichols et al. (2012) for larger firms (23%, 57%, 16% and 17% respectively), the intermediate-size European companies studied here prefer a relatively "recognised and common" indicator. The proportion of companies using EBIT is close to the finding (58%) obtained by Berger and Hann (2007) in a study based on a sample of American companies applying SFAS 131. Net income

– an IFRS standardised indicator – is only reported in a segment approach by 18% of companies. Similar to the proportion found by Nichols et al. (2012), this figure may seem low but this indicator is not necessarily easy to produce for segments and is not necessarily useful in decision making. Detailed information on companies' assets and liabilities is seldom provided, except for non-current assets which are sometimes reported in several segmentations. Without providing any additional remarks, the study by Nichols et al. (2012) indicates the disclosure rate for breakdown of liabilities: 14% for the operating segmentation and barely 3% for the secondary geographic segmentation. The intermediate-size companies studied in our sample provide a little more detailed information on assets and liabilities.

Information on segment goodwill is provided by 13% of companies, on research and development by 3% and on cash-flows by 4%.

Finally, 9% of the firms report segment information on non-financial indicators.

5.4.2 Voluntary Segment Information by Type of Segmentation

Table 12 presents the findings on voluntary information disclosure by type of segmentation, indicating any significant differences between companies that adopt an LOB segmentation and those that adopt a geographic segmentation.

Overall, the general tendencies previously observed are also found here by type of segmentation.

Companies that adopt an LOB segmentation disclose more details on income statement cost items than those with a geographic segmentation. We also note that they provide generally more information on non-current assets. Indeed, these firms report this indicator in the geographic format and also sometimes in the LOB format.

Table 12. Voluntary segment information by type of segmentation

Voluntary segment information items	LOB Segmentation		GEO. Segmentation		Matrix Segmentation		***Total***	
	N 137	***% 100%***	***N 53***	***% 100%***	***N 7***	***% 100%***	***N 197***	***% 100%***
Detailed sales items	40	29%	13	25%	3	43%	*56*	*28%*
Detailed expenses items	74	54% (+)	20	38%	1	14%	*95*	*48%*
Measure of profit or loss (other than EBIT. EBITDA or Net Income)	49	36%	19	36%	2	29%	*70*	*36%*
EBITDA	35	26%	8	15%	0	0%	*43*	*22%*
EBIT	97	71%	34	64%	5	71%	*136*	*69%*
Net Income	26	19%	8	15%	1	14%	*35*	*18%*
Non-current assets	59	43% (+)	13	25%	3	43%	*75*	*38%*
Current assets	15	11%	5	9%	3	43%	*23*	*12%*
Goodwill	20	15%	6	11%	0	0%	*26*	*13%*
R&D	5	4%	1	2%	0	0%	*6*	*3%*
Non-current liabilities	9	7%	5	9%	1	14%	*15*	*8%*
Current liabilities	9	7%	5	9%	1	14%	*15*	*8%*
Cash flows	6	4%	1	2%	1	14%	*8*	*4%*
Non financial items	11	8%	5	9%	1	14%	*17*	*9%*

(+) or (-) : Indicates a significant positive or negative difference in mean (LOB compared with GEO segmentation)(t-test, confidence 95%)

5.4.3 Voluntary Segment Information by Country of Domicile

Voluntary information disclosure rates depending on companies' country of domicile are presented in Table 15, which indicates whether this rate is significantly higher (+) or lower (-) than the average for all the other countries.

German companies stand out from the companies of the other countries for their higher disclosure rate of details on ordinary revenues in the income statement and on EBITDA. On the other hand, they disclose less detailed segment information on assets and liabilities.

French companies report more detailed segment information on assets and liabilities and also on cash flows. Moreover, they disclose net segment income more frequently, but are disinclined to report EBITDA.

On average, UK firms disclose less voluntary information, particularly information about the breakdown of balance sheet items, intangibles and cash flows.

Italian firms generally tend to report EBIT, but none of them provides information on segment cash flows.

Table 12. Voluntary segment information by country of domicile

	Germany			France			UK			Italy			***Total***	
	N	***%***	***Sig***	***N***	***%***	***Sig***	***N***	***%***	***Sig***	***N***	***%***	***Sig***	***N***	***%***
Voluntary segment information	***56***	***100%***	***(1)***	***50***	***100%***	***(1)***	***70***	***100%***	***(1)***	***21***	***100%***	***(1)***	***197***	***100%***
Detailed sales items	25	45%	(+)	10	20%		16	23%		5	24%		***56***	***28%***
Detailed expenses items	29	52%		17	34%	(-)	37	53%		12	57%		***95***	***48%***
Measure of profit or loss (other than EBIT. EBITDA or Net Income)	18	32%		22	44%		26	37%		4	19%		***70***	***36%***
EBITDA	19	34%	(+)	2	4%	(-)	13	19%		9	43%		***43***	***22%***
EBIT	37	66%		34	68%		47	67%		18	86%	(+)	***136***	***69%***
Net Income	5	9%	(-)	17	34%	(+)	11	16%		2	10%		***35***	***18%***
Non-current assets	22	39%		21	42%		22	31%		10	48%		***75***	***38%***
Current assets	2	4%	(-)	14	28%	(+)	3	4%	(-)	4	19%		***23***	***12%***
Goodwill	8	14%		8	16%		8	11%		2	10%		***26***	***13%***
R&D	3	5%		1	2%		0	0%	(-)	2	10%		***6***	***3%***
Non-current liabilities	1	2%		12	24%	(+)	0	0%	(-)	2	10%		***15***	***8%***
Current liabilities	1	2%	(-)	12	24%	(+)	0	0%	(-)	2	10%		***15***	***8%***
Cash flows	2	4%		6	12%	(+)	0	0%	(-)	0	0%	(-)	***8***	***4%***
Non financial items	5	9%		7	14%		3	4%		2	10%		***17***	***9%***

(+) or (-) : Indicates a significant positive or negative difference in mean in comparison with other countries (t-test, confidence 95%)

5.4.4 Voluntary Segment Information by Sector

Table 14 presents the disclosure rate of voluntary information for firms in each of the five sectors studied and indicates whether this rate is significantly higher (+) or lower (-) than the average for all the other sectors.

Overall, the information technology and telecommunications sector and the energy and materials sector tend to disclose more voluntary segment information. Specifically, companies in these sectors provide segment information on certain income statement details (essentially on costs).

Health care sector companies are in the middle with good disclosure of details on assets and liabilities. We might have expected greater disclosure from these companies in the area of intangibles, but it is not the case here.

Finally, companies in the consumer goods and services sector and in industrials provide slightly less voluntary information, especially concerning the breakdown of balance sheet items.

Table 14. Voluntary segment information by sector

	Consumer G&S		Energy & Materials		Health Care		Industrials		Information Tech. & Telecom		***Total***	
Voluntary segment information	N	%	N	%	N	%	N	%	N	%	***N***	***%***
	39	***100%***	***23***	***100%***	***14***	***100%***	***53***	***100%***	***68***	***100%***	***197***	***100%***
Detailed sales items	9	23%	9	39%	3	21%	17	32%	18	26%	***56***	***28%***
Detailed expenses items	20	51%	14	61%	8	57%	17	32% (-)	36	53%	***95***	***48%***
Measure of profit or loss (other than EBIT. EBITDA or Net Income)	13	33%	11	48%	4	29%	16	30%	26	38%	***70***	***36%***
EBITDA	8	21%	5	22%	0	0% (-)	10	19%	20	29%	***43***	***22%***
EBIT	23	59%	19	83%	9	64%	42	79% (+)	43	63%	***136***	***69%***
Net Income	9	23%	2	9%	3	21%	9	17%	12	18%	***35***	***18%***
Non-current assets	11	28%	12	52%	6	43%	17	32%	29	43%	***75***	***38%***
Current assets	3	8%	3	13%	3	21%	6	11%	8	12%	***23***	***12%***
Goodwill	3	8%	3	13%	1	7%	6	11%	13	19%	***26***	***13%***
R&D	1	3%	0	0% (-)	1	7%	0	0% (-)	4	6%	***6***	***3%***
Non-current liabilities	1	3%	2	9%	3	21%	3	6%	6	9%	***15***	***8%***
Current liabilities	1	3%	2	9%	3	21%	3	6%	6	9%	***15***	***8%***
Cash flows	4	10%	0	0% (-)	1	7%	1	2%	2	3%	***8***	***4%***
Non financial items	3	8%	2	9%	0	0% (-)	6	11%	6	9%	***17***	***9%***

(+) or (-) : Indicates a significant positive or negative difference in mean in comparison with other industry sectors (t-test, confidence 95%)

6. Conclusion

The objective of this paper is to examine the implementation of the IFRS 8 standard by intermediate-size European listed companies. At a time when the IASB is beginning its post-implementation review of IFRS 8, this study makes an original contribution to the question by examining the disclosure behaviour of intermediate-size European listed companies whereas most previous studies focused on large companies.

Our study is based on the 2010 annual reports of a sample of 197 companies from four European countries: the UK, France, Germany and Italy. While it confirms the fact that a majority (70%) of companies choose an LOB segmentation – already observed in earlier studies on large companies – our study highlights specificities in the disclosure behaviour of intermediate-size listed companies as well as national particularities which may be useful to the IASB.

The intermediate-size listed companies in our sample report fewer segments on average than large multinationals, but their disclosure behaviour differs slightly depending on the type of segmentation chosen and the country of domicile. The intermediate-size companies that chose an LOB segmentation report on average 3.15 segments and 11 segment items, compared with 3.45 and 9.79 respectively for those that chose a geographic segmentation. German companies report on average more segments and more segment data than the rest of the sample.

The rate of compliance with IFRS 8, measured by observing whether the information required or suggested is reported in the appendices of annual reports, is lower than that observed by Nichols et al. *(2012)* for a sample of European multinationals. While virtually all the intermediate-size companies in our sample report ordinary revenues, few of them (29%) provide an explanation about their segmentation. Segment assets are reported in 73% of the cases, but this rate drops to 58% for segment liabilities. We can conclude then that there is inadequate compliance with IFRS 8. Studies on other standards would allow us to determine whether intermediate-size companies have, on average, a lower rate of compliance with IFRS standards than larger companies. Our study also reveals disparities linked to the geographic origin of companies. For example, German companies have a better disclosure rate than the other companies in the sample for almost every segment item. Conversely, French companies have a lower disclosure rate than the other companies for a large number of items. This generally inadequate level of compliance for the sample as a whole – with differences depending on the geographic origin of the companies studied – raises questions about the implementation of IFRS standards in different countries where they are mandatory and also about the applicability of IFRS 8.

Our study opens up several avenues for future research. First, it would be interesting to analyse whether the segment data reported in appendices is consistent with that reported in other sections of a company's annual report and with that communicated during presentations to financial analysts. Second, an analysis of the reports written by financial analysts on the companies in the sample, possibly supported with interviews, would help us to better understand how analysts use the segment information reported.

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Remarkable Funders: How Early-Late Backers and Mentors Affect Reward-Based Crowdfunding Campaigns

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Abstract

In recent years, the growth of the reward-based crowdfunding model has offered new opportunities to meet the funding requirements of start-ups. However, the achievement of the funding target is still a complex goal, given the existence of several information barriers between insiders (project proponents) and outsiders (backers) of a crowdfunding campaign. Within the framework of the information asymmetry and the theory of signals, this study aims to analyse the role of two kinds of previously un-investigated funders in determining the success of crowdfunding campaigns: early-late backers (who are placed at the beginning of the tail of the campaign) and mentors (who are represented by firms acting as more expert backers). The findings indicate that both types of funders are remarkably important for the success of a crowdfunding campaign.

Keywords: crowdfunding, information asymmetry, reward-based model, signalling theory

1. Introduction

In recent years, crowdfunding has emerged as a financing channel for a wide range of entrepreneurial initiatives, both for and not-for profit. The main feature of this unconventional model of raising capital is the use of Internet platforms that allow proponents of a project (creators) to reach an indefinite set (the crowd) of potential funders (backers) (Note 1). The diffusion of crowdfunding is confirmed by the numbers: worldwide, there are more than 1,200 portals, with the capital collection exceeding 16.2 billion dollars in 2014, which represents a 160% growth from 2013 (Massolution, 2015). In parallel with this growth, scientific interest in the crowdfunding phenomenon has significantly increased, including the search for a taxonomy (Griffin, 2012; Kaartemo, 2017). With reference to the reward-based model, which represents the focus of this paper, crowdfunding can be defined as an open call for providing financial resources in exchange for future products or some form of rewards (Belleflamme, Lambert, & Schwienbacher, 2014).

Since the evidence suggests that the legitimacy of a project to be funded is not easy to obtain during crowdfunding (Frydrych, Bock, Kinder, & Koeck, 2014), one of the most salient research topics is the study of determinants of a successful campaign, which is defined as an initiative that reaches its funding target. In this regard, the literature has provided some theoretical and empirical evidence, but the topic is still far from being fully explored. Further investigations on why some projects succeed while others fail are rooted in a well-established conceptual framework represented by the information asymmetry (Akerlof, 1970) and the theory of signals (Spence, 1973).

The crowdfunding market shows a mix of specific elements that may exacerbate the distorting effects caused by the informational distance that normally exists between the insiders (creators or proponents) and outsiders (backers) of a project. Some of these elements are the virtual environment of transactions, the absence of personal interaction, the lack of formal procedures for the assessment of project quality, and the participation of backers without expertise at the individual level. All these distinguishing features present the question of which factors can mitigate the information barriers that may hinder the achievement of the funding target. The present paper aims at contributing to fill this knowledge gap. In particular, assuming that the crowd is not a monolithic entity, this study focuses on the 'certification' function of some kinds of funders who have not been investigated earlier, such as the backers placed at the beginning of the tail of a crowdfunding campaign and the firms that act as mentors of a project. The theoretical basis here is the social information embedded in others' funding decisions (Kuppuswamy and Bayus, 2015), that may mitigate the distortions of the information asymmetry.

Similar to what happens in online auctions (Ockenfels & Roth, 2006), in the case of crowdfunding campaigns too, a significant number of backers are distributed closer to the deadline of the time window of a crowdfunding campaign (Kuppuswamy & Bayus, 2015). Therefore, unlike previous literature that has focused on the effect of early backers intervening at the start of the campaign (Colombo, Franzoni, & Rossi - Lamastra, 2014), this paper studies the impact of the early-late backers who are placed at the beginning of the tail of the fundraising process on crowdfunding platforms.

In relation to the standing of potential funders, the focus of this study is also on the impact of firms that act as backers with more expertise or representative backers. The latter are renowned companies that exercise a mentoring function toward the feasibility of an initiative. The theoretical framework is the endorsement effect of prominent third parties (Stuart, Ha, & Ralph., 1999) that may mitigate information barriers the backers in general have to face due to a widespread lack of expertise at the individual level.

The hypotheses are tested through data obtained from Produzioni dal Basso and Eppela, which are the main Italian platforms. This investigation is also an opportunity to analyse reward-based crowdfunding in a very little investigated country compared to other socio-economic systems such as the Anglo-Saxon contexts (Bouaiss, Maque, & Mèric, 2016). We use a sample of 578 campaigns launched in Italy between 2013 and 2015. The econometric models fully support the assumptions of the study about the positive impact that early-late backers and companies acting as mentors have on the probability of a campaign reaching the funding target.

The remainder of this paper is arranged as follows. The next section presents the theoretical background and the hypotheses. The third section addresses the methodology, while the fourth section presents and discusses the empirical results of the survey. The final section contains the conclusions of the study and indications for future research directions.

2. Theoretical Background and Hypotheses

2.1 Information Asymmetry in Reward-Based Crowdfunding

As theorised by Akerlof (1970), the information asymmetry between actors of an exchange process may degenerate into distorting effects, such as the adverse selection phenomenon, that enhance the feeling of uncertainty and risk underlying the transaction. With regard to this problem, the signalling theory (Spence, 1973) analysed the mitigating impact of information cues. In particular, the theory of signals has found extensive application in the studies on venture capital (Baum & Silverman, 2004; Gompers, 1996; Lee & Wahal, 2004). However, in the reward-based crowdfunding market, information asymmetries and signals assume specific features that are connected to the mechanisms of this unconventional financial mode. In fact, similar to other on-line markets, the condition of asymmetric information between insiders and outsiders is fuelled by the virtual environment in which a new initiative is presented and the financing decision is taken. In addition, the use of internet platforms not only modifies the storytelling of a project (Frydrych et al., 2014), but also affects the screening process, which must do without any personal dialogue between founder and funder (Agrawal, Catalini, & Goldfarb, 2015). Moreover, as an electronic market, reward-based crowdfunding may be associated with an increase in fraud risk, as fictitious applicant profiles could be created and the disclosure of information may not be easily verifiable remotely. Therefore, compared to conventional forms of financing, the digital context and the physical disintermediation limit the assessment of quality and trustworthiness based on a more standardized mix of hard and soft information that is usually obtainable through financial statements, official documents and repeated personal interactions (Petersen, 2004; Stein, 2002).

The use of the internet has further contrasting implications. In particular, the economic benefit derived from the reduction of the geographical distance between proponents and funders is counterbalanced by lower backer protection due to potential conflicts existing between different jurisdictions (Tomboc, 2013). Moreover, from the perspective of the proponent, additional risks may arise due to the absence of confidentiality agreements or other instruments that can safeguard the creator's rights. In addition, the lack of prior agreements may discourage the founder from disclosing sensitive details of the new initiative, which might have a detrimental effect on the screening process. Therefore, while the poor structuring of crowdfunding and virtual media can help its diffusion, they may be also a disadvantage with regard to the mitigation of information asymmetry.

Despite the frequent parallelism drawn between crowdfunding and the venture capital market (Cordova, Dolci, & Gianfrate, 2015; Courtney, Dutta, & Li, 2017; Mollick, 2014), reward-based crowdfunding has a significantly different approach that sharpens the informative distance between founders and funders. There is not a formal due diligence, the financing method by stages is unsuitable for one time projects, and there are no governance agreements due to the frequent absence of legally recognized companies behind the new venture.

In addition, backers generally have limited technical knowledge regarding a project, and therefore, they do not perform the same certification function that literature attributes to venture capitalists (Gompers, 1995; Megginson & Weiss, 1991).

As stated by Kim and Viswanathan (2016), while players in the formal venture capital market require a mix of money and expertise for the evaluation and management of risks, reward-based crowdfunding unbinds these two resources and allows funders without the necessary competencies to be part of the financing campaign (Agrawal, Catalini, & Goldfarb, 2014; Ahlers, Cumming, Günther, & Schweizer, 2015). It is a democratization phenomenon that broadens the participation of potential backers, but at the same time, it may exacerbate the information asymmetry condition that advocates can experience at the act to select and finance an initiative which has attracted their interest.

All the studies published in the literature so far imply that less sophisticated and poorly informed funders could benefit from signals of quality and trustworthiness that are not directly observable. Therefore, it is important to identify factors that may act as informational cues and counterbalance the risks connected to the information gap between creators and backers. The relevance of signals is confirmed by earlier studies on the proxies of project quality (Courtney et al., 2017; Cumming, Leboeuf, & Schwienbacher, 2014; Kunz, Bretschneider, Erler, & Leimeister, 2017; Mollick, 2014;), on the social capital (Nahapiet and Goshal, 1998; Greve and Salaff, 2003) and on the digital networks (Mollick, 2014; Colombo et al., 2014; Cumming et al., 2015; Thies and Wessel, 2014; Kunz et al., 2017; Kang, Jiang, & Tan, 2017). The common denominator of these research paths is the identification of drivers that can mitigate the information asymmetry affecting the crowdfunding market. From this perspective, the social information embodied in others' funding decisions (Kuppuswamy & Bayus, 2015) may be an additional resource which compensates for the lack of direct observation or limited personal capability to assess the feasibility of a crowdfunding campaign. Therefore, the focus of this study is on two different kinds of backers who have not yet been investigated, but are potentially important for reaching the funding target: (1) early-late backers who give a signal to advocates during the tail of the campaign (the deadline effect) and (2) renowned firms (the endorsement effect) that play the role of mentors of a project (see Fig. 1).

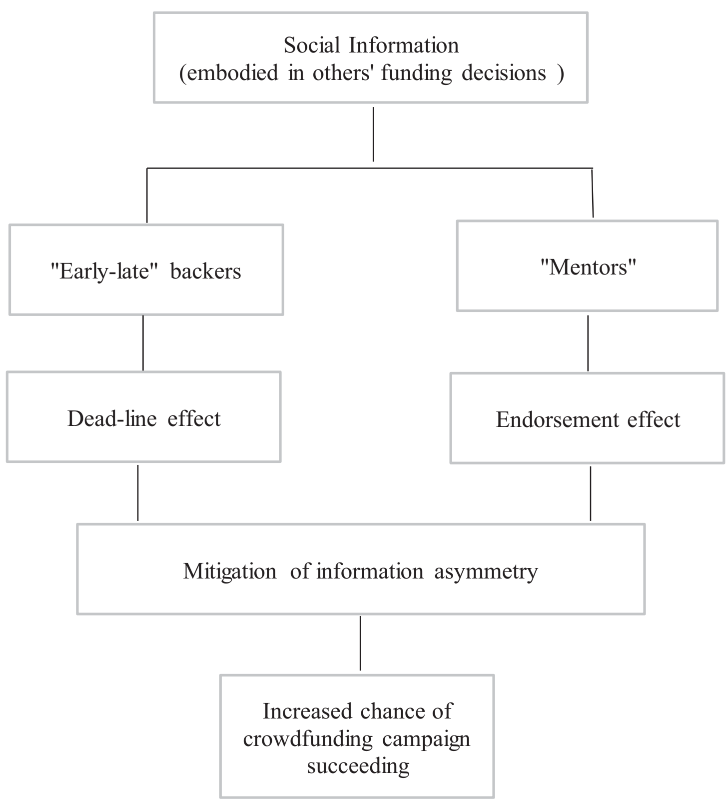

Figure 1. Conceptual framework

2.2 Impact of 'Early-Late' Backers

Mimicking the behaviour of others, although not necessarily the best decision, can be considered as rational behaviour in the presence of information asymmetries that separate the potential willingness to act from the actual action. Considering that "one buyer's behaviour affects another buyer's expected utility" (Hu, Li, & Shi, 2015, pag.355), the basis of this approach may lie in economic convenience. That is, since participation in a crowdfunding campaign is at the least a time-consuming decision (Note 2), the option to fund an initiative already supported by others could be efficient due to the fact that the campaign has a higher probability of success. That is, pledging money to a project that seems likely to succeed is more appealing than pledging money to a campaign that appears likely to fail. In fact, according to the reinforcement model (Cordova et al., 2015), the higher the popularity of a project among the crowd, the higher are its chances of reaching the funding goal. It has been observed that backers are not homogenously distributed along the time window of a campaign. In particular, a relevant portion tend to be placed at the end of the time window (Kuppuswamy & Bayus, 2015, 2017). This behavioural model is explained by the deadline effect, and it is very thoroughly described within the context of the games theory and the field of social psychology. In game theory research, experimental analysis shows that agreement between parties is frequently achieved in the terminal stages of a bargaining process (Gneezy, Kapteyn, & Potters, 2003; Roth, Murnighan, & Schoumaker, 1988). In social psychology research, delaying a final decision or an action has been shown to be a familiar and widespread behaviour among people (Ariely & Wertenbroch, 2002). This behaviour tends to diminish significantly in the proximity of an official deadline, while the effect produced by a self-imposed deadline seems to be less effective. All this evidence strengthens the belief about the existence of a deadline effect, especially if the individual cannot change the rules of the deadline, as in the case of the procedures imposed by crowdfunding platforms or some on-lines auctions (Ariely & Simonson, 2003; Ariely, Ockenfels, & Roth, 2003; Ockenfels & Roth, 2006).

If in a given informative context, waiting for the deadline before deciding may seem like a rational strategy, according to social psychology (Ariely and Wertenbroch, 2002), with the expiry of a deadline, the balance between benefits and costs of bystander behaviour tends to change. This occurs especially when the deadline for taking the decision can no longer be postponed, and when the lack of individual action near the deadline is associated with the risk of losing the last opportunity to facilitate a positive outcome of a given initiative. From this perspective, in the reward-based crowdfunding market, late backers that are placed along the tail of the harvesting phase can be determinants of the success of a campaign. More specifically, in terms of signalling, we refer to the advocates that act at the beginning of the tail of the campaign and that conventionally may be called early-late backers. These advocates can trigger the final effort for a campaign to succeed. The transmission mechanisms of their behaviours near the expiration date can be compared to those of the initial backers (Colombo et al., 2014), such as observational learning (Bikhchandani, Hirshleifer, & Welch, 1998) and word of mouth (Arndt, 1967) which concur to mitigate the absence of better and direct information. In the case of both mechanisms, the funders positioned in proximity of the deadline of the campaign derive information from merely observing the behaviour of others. Therefore, the early-late backers consolidate the signalling and financial efforts of earlier funders, as well as launch the final sprint of the later backers, thereby increasing the chances of the project reaching the financing target. Based on this information, the first hypothesis is formulated as follows:

H1: Early-late backers have a positive impact on the likelihood of a reward-based crowdfunding campaign succeeding.

2.3 Impact of a Project Mentor

Studies on early-stage financing have highlighted that the certification function of venture capitalists is not independent of their standing (Gompers 1996; Gompers & Lerner, 1997; Lee & Wahal, 2004). That is, the weight of a signalling effect in the capital market increases with increase in the reputation and experience of funders. These findings can be applied to understand the mechanics of reward-based crowdfunding. In particular, this unconventional market may be segmented on the supply side, not only according to the entry time of backers, but also according to their reputation and expertise (Kim & Viswanathan, 2016).

The participation of more competent and renowned funders can promote the success of the crowdfunding campaign, both through their financial contribution and the certification of the new initiative. Moreover, hesitant and less experienced backers have the opportunity to exploit the information that arises from the participation of well-known supporters (Kim & Viswanathan, 2016). This phenomenon can be compared to the endorsement effect of prominent third parties (Stuart et al., 1999), whose participation can provide a signal of further credibility to a crowdfunding campaign (Cordova et al., 2015; Courtney et al., 2017).

It is not always easy to identify the features of a supporter. While within conventional financial markets the endorsement effect can be more easily attributable to qualified merchant banks or venture capitalists with a broad track record, in the crowdfunding market, it is more complex due to the high level of anonymity and variance in the composition of the crowd. For this reason, the endorsement effect can be more easily attributable to the presence of organizations represented by companies that are already operating in the same sector of the new goods or services presented on the platform, or to well-known firms that pursue social objectives. A backer with these characteristics may assume the role of mentor of a project that can contribute to the success of the campaign through the mix of financial resources and expertise. In fact, both these transactional resources co-exist in the case of mentors, without distorting the functioning of a reward-based crowdfunding market.

Therefore, the second hypothesis is formulated as follows:

H2: The participation of a mentor has a positive impact on the likelihood of a reward-based crowdfunding campaign succeeding.

3. Method

3.1 Data Collection

This study obtained data on reward-based crowdfunding from the two main Italian platforms: Produzioni dal Basso and Eppela. The choice to analyse the Italian market was based on several factors. First, it is a less investigated country. Second, there is a digital divide between Italy and other advanced European nations (European Commission, DESI 2016). Third, crowdfunding has experienced relevant growth in the Italian context. In particular, with a collection of 56.8 million Euros (Univ. Cattolica and TIM, 2016), Italy represented 10% of the European crowdfunding market at the end of 2015. The average size of project funds is around 5000 Euro, and the reward-based model represents 13% of the Italian crowdfunding market. Moreover, reward-based crowdfunding has seen a significant increase in terms of platforms (90 are currently active) and funds raised (89%). At the same time, Italy shows (We are social, 2016) a web penetration index equal to 58% as opposed to the European average of 68%, and a lower social penetration index (46%) than that in the most advanced and investigated countries such as the US (58%) and UK (59%).

Internet platforms represent one of major actors of any crowdfunding market. The literature has mainly focused on data gathered from two leading platforms in the US: Indiegogo and Kickstarter. However, the quantity and quality of data disclosed by platforms are not homogeneous, and this limits the generalizability of prior findings. A higher degree of information, about both the creators and backers, is a main feature of Kickstarter and Indiegogo, but these attributes are not universal among internet platforms (see Appendix A). The existence of such differences is an additional justification for advancing the state of knowledge about crowdfunding in a technical context such as Italy. In May 2016, Eppela and Produzioni dal Basso accounted for 92% of the total successful projects on hybrid platforms (reward and donation-based) and 60% of the funds raised in Italy (Starteed, 2016). Both of them are generalist platforms, since they host projects from different sectors.

3.2 Variables and Models

The present study covers all the reward-based crowdfunding campaigns on Produzioni dal Basso and Eppela that ended between 2013 and 2015. However, 238 projects were dropped during the sampling process because it was not possible to trace the amount of capital required. Therefore, the final sample consists of 578 campaigns: 391 (68%) were extracted from the Eppela platform, while the remaining 187 (32%) were from Produzioni dal Basso. Data for each project were gathered directly from the platforms.

The empirical analysis applied here is both descriptive and inferential. In particular, this paper adopts logistic models following a forward stepwise regression approach in order to identify the statistical significance of variables and models. In accordance with previous studies (Colombo et al., 2014; Cordova et al., 2015; Kunz et al., 2017; Mollick, 2014), the dependent variable was a dummy (*Success*), which was assigned a value of 1 if the campaign was successful (that is, pledges covered at least 100% of the funding target) and 0 otherwise (that is, pledges covered less than 100% of the funding target).

Since the platforms make visible the necessary information, in order to test the first hypotheses (H1), in all the econometric models, this study adopts a variable (*Early_Late_Backers*) which measures the number of backers conventionally identified as advocates whose participation occurs in a time window equivalent to one-sixth of the tail of the campaign (Note 3). In particular, the platforms show a list of those who are indicated as late backers, in addition to the date of their intervention. The tail starts with the first of the late backers reported on the crowdfunding platforms. The tail length shows a time interval that on average equals 8 days, with a maximum of 52 days.

For testing of the second hypothesis (H2), the logistic models include a dummy variable (*Mentor*) that is assigned a value of 1 if a project received the support of a company that assumed a mentoring and funding function and 0 otherwise.

The analysis adopts several control variables that cover a wide range of information about project characteristics and digital interaction with backers. These variables are consistent with previous studies that highlighted the effects of project size, the average contribution by backers, the impact of proxies of project quality, and the influence of relational capital mediated by social networks (Colombo et al., 2014; Cordova et al., 2015; Kunz et al., 2017; Mollick, 2014). The following control variables were used:

Log_Funding Target: This is a logarithmic measure of the funding target required by the proponent.

Log_Funding per backer: This is the logarithmic value of the mean contribution of backers.

Photo: This is a dummy variable that is assigned a value of 1 if the project presentation includes at least one photo, and is assigned a value of 0 otherwise.

Video: This is a dummy variable that is assigned a value of 1 if the project presentation includes at least one video and 0 otherwise.

Updates and *Comments:* These variables measure the number of updates and comments on a project, respectively, during the campaign.

FB_Page: This is a dummy variable that is assigned a value of 1 if the campaign has a Facebook page associated with the project and 0 otherwise.

TW_Account: This is a dummy variable that is assigned a value of 1 if the project page includes a Twitter account dedicated to the initiative and 0 otherwise.

The logistic regressions include a project category control through eight dummy variables related to the sector classification proposed by the platforms (Note 4). In addition, to control for the digital divide in the Italian context, the models include a variable which measures the social network penetration rate in Italy by year (SNindex) within the time window analysed for each project.

The regression models are formalized as follows:

Model 1: Success = β_1Early_Late_Backers + β_2Mentor + β_3Log_FT + β_4Log_Fund_back + β_5SN_index + β_6Sector.

Model 2: Success = β_1Early_Late_Backers + β_2Mentor + β_3Log_FT + β_4Log_Fund_back + β_5Photo + β_6Video + β_7Updates + β_8SN_index + β_9Sector.

Model 3: Success = β_1Early_Late_Backers + β_2Mentor + β_3Log_FT + β_4Log_Fund_back + β_5Photo + β_6Video + β_7Updates + β_8Comments + β_9Fb_page + β_{10}Tw_account + β_{11}SN_index + β_{12}Sector.

Finally, through the application of the SPSS programme, the study adopts several goodness of fit measures for logistic regressions (overall percentage, Cox & Snell R-square, Nagelkerke R-square, and the Hosmer-Lemeshow Test). All the measures indicate that the models adequately fit the data.

4. Results

4.1 Descriptive Statistics

Table 1 provides descriptive statistics related to both successful and failed campaigns. The first group consists of 454 initiatives, representing 79% of the total campaigns included in our data. On average, the funding target of successful campaigns is slightly lower (€ 5341,11) than the amount of capital that failed projects seek to raise (€ 5855, 24). On the contrary, the mean funding ratio, which represents the ratio of the final funding to the capital requested, is much higher in the successful group (1.09) than in the failed group (0.09). This evidence is consistent with prior descriptive analyses (Frydrych et al., 2014). In fact, successful projects tend to get over-funded, while unsuccessful campaigns fail by a wide margin. In other words, as stated by Mollick (2014), failures happen by large amounts, successes by small amounts. This feature of the reward-based crowdfunding market is confirmed by the percentage of the funding target achieved by the failed initiatives (see Fig. 2): 54% of the unsuccessful projects did not exceed 10% of the amount requested, 35% collected between 11% and 30% of the amount requested, 7% collected between 31% and 50%, and only 4% of the failed projects exceeded more than 50% of the initial capital requested.

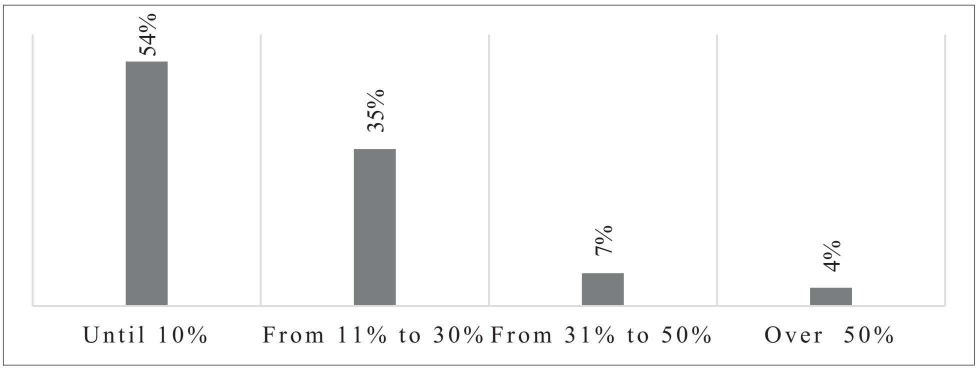

Figure 2. Percentage of requested funding received for failed projects

The distribution of the funding ratio between the successful and unsuccessful projects confirms the difficulty faced by a new initiative in being legitimized during a crowdfunding campaign. This trend finds additional support in the data on the backers. On average, successful projects had a higher number of advocates (78.15) than failed projects (17.48). Moreover, for projects that reached or overreached the funding target, the average contribution by backers was more than double (€ 79,98) that of failed campaigns (€ 34,03). Finally, by segmenting the crowd according to entry time and the standing of backers, the following differences were observed between successful and unsuccessful projects: (1) the mean incidence of early-late backers along the tail of the campaign was higher for successful projects (35%) than failed initiatives (9%), and (2) a higher percentage of successful campaigns than unsuccessful campaigns were backed by a mentor (16% vs. 2%). Therefore, the participation of a renowned firm seems to be a distinctive feature of initiatives that have reached at least the financial budget.

Table 1. Descriptive statistics

Successful (N= 454)	**Mean**	**St. Dev.**	**Min**	**Max**
Funding target	5341.11	8935.75	350.00	100 000.00
Final funding	6164.26	13732.56	350.00	238308.00
Funding ratio	1.09	0.11	1.00	2.38
N. Backers	78.15	240.00	2.00	4783.00
Funding per backers	70.98	22.64	44.48	280.00
Early last backers/ Last backers	0.35	0.23	0.00	0.90
Mentor	0.16	0.37	0.00	1.00
Failed (N= 124)	**Mean**	**St. Dev.**	**Min**	**Max**
Funding target	5855.24	4895.64	600.00	35000.00
Final funding	766,06	1255.88	5,00	10607.00
Funding ratio	0.09	0.05	0.01	0.31
N. Backers	17.48	17.43	1.00	105.00
Funding per backers	34.03	12.76	5.00	101.02
Early last backers/ Last backers	0.09	0.21	0.00	1.00
Mentor	0.02	0.15	0.00	1.00

4.2 Multivariate Analysis

In this section, the study aims to provide econometric evidence that the specific backer categories under investigation, such as the early-late backers and the mentor, are significant determinants of successful reward-based crowdfunding campaigns. In the third model, which includes all the variables, the average VIF is 1.384, which is below the conventional threshold of 6, and the maximum VIF is 2.334, below the conventional threshold of 10 (McDonald & Moffit, 1980). Moreover, all the values of the correlation matrix are sufficiently lower than the conventional threshold of 0.7 (Ratner, 2009). These findings indicate that multicollinearity is not an issue (Note 5). The findings of the regression analysis are reported in Table 3. First, as expected, the backers placed along the beginning of the tail of the campaign have a positive impact on the success of initiatives. That is, the higher the number of early-late backers, the more likely is the reward-based crowdfunding campaign to reach the funding target. This confirms the role of remarkable funders during a critical phase of the crowdfunding cycle represented by the approach of the expiration date of a campaign (deadline effect). Second, the presence of a company that supports a campaign is a positive predictor of successful crowdfunding initiatives. The participation of renowned companies functions not only as an additional financing contribution, but also as an endorsement of the new project. Therefore, transactional resources (Kim & Viswanathan, 2016), represented by a mix of financial capital and know-how, allow these kinds of advocates to fuel the chances of success of a reward-based crowdfunding campaign.

Table 3. Logistic regression models

	Dependent Variable: Success					
Independent variables	Model 1		Model 2		Model 3	
	B coeff.	**Wald**	**B coeff.**	**Wald**	**B coeff.**	**Wald**
Early_late_backers	0.659***	47.204	0.719***	46.214	0.725***	45.907
Mentor	4.410***	30.029	4.617***	31.615	4.618***	31.29
Log_FT	3.924***	38.136	4.315***	40.223	4.268***	38.698
Log_Fund_back	-3.811***	37.323	-4.017***	38.342	-4.0156***	38.058
Photo			-1.464**	9.864	-1.463**	9.861
Video			0.648	0.032	0.899	0.059
Updates			0.181	1.646	0.176	1.203
Comments					-0.020	0.002
Fb_ page					-0.300	0.242
Tw_account					0.125	0.121
SN_index	3.969	0.114	28.259*	3.645	27.871*	3.522
Project Category Dummies	YES		YES		YES	
Costant	3.390	0.211	-11.516	1.518	-11.235	1.430
N° of observations	578		578		578	
Mean VIF	1.360		1.388		1.384	
Maximum VIF	2.322		2.326		2.334	
Model Summary						
-2 Log likelihood	238.816		226.670		226.335	
Cox & Snell R-Square	0.466		0.482		0.482	
Negelkerke R-Square	0.656		0.679		0.680	
Hosmer and Lemeshow Test:						
Chi-square	12.285		4.349		5.357	
Sig.	0.139		0.824		0.719	

Significance level: ***1%; **5%;

In summary, early-late backers (H1) and the participation of a mentor (H2) are factors associated with an increase in the likelihood of a reward-based crowdfunding campaign succeeding. Thus, the results of the data analysis prove the hypotheses presented.

With respect to the control variables, in accordance with prior evidence (Colombo et al., 2014; Cordova et al., 2015; Mollick, 2014), the findings show that the probability of success is negatively associated with the capital target. If this result is interpreted through the theory of signals, one possible reason is that when funders are faced with relatively larger projects, they feel that their contribution is not as big determinant of success as it is for smaller ones. Therefore, they could decide to sustain projects that have a smaller funding target but seem to have more chances of success. The higher the funding requested, the lower is the probability of a project reaching the funding goal due to the generation of an adverse signal that reduces the conviction of the crowd to support a new initiative. Moreover, the second and the third models show that the insertion of photos and the social network index have a significant impact on the chances of success, but with a different sign. In fact, consistent with other empirical studies (Kunz et al., 2017), the present findings show that photos have a negative impact on the likelihood of a crowdfunding campaign succeeding, and that the higher the penetration index of social networks, the higher is the likelihood of a project reaching the funding goal. Probably, the recourse to photos, even if it is only theoretically a sign of quality (Mollick, 2014), does not necessarily mean that the project has greater appeal. Low image quality or a negative subjective evaluation of this kind of graphic material may contribute to undermining the attractiveness of a new initiative. At the same time, it is possible that excessive use of images will result in a very cluttered project page which could hinder readability, without necessarily adding useful information. On the contrary, given the virtual environment of crowdfunding, increasing the diffusion of confidence within digital social networks also increases the opportunity to leverage on additional media to lend popularity to a project among potential funder.

5. Discussion

Starting from two well-established conceptual frameworks—the information asymmetry theory (Akerlof, 1970) and the signalling theory (Spence, 1973)—this paper examines the themes related to the success of reward-based crowdfunding campaigns. Both theories present unique characteristics in the crowdfunding market that may be an obstacle to reaching the funding target, and this is confirmed by the wide gap that normally distinguishes successful campaigns from failed ones. Consistent with this issue, our analysis aimed to examine in depth the role of two kinds of backers that have not yet been investigated, and may contribute to the reliability and feasibility of a crowdfunding initiative. In particular, based on the concept of social information being embodied in others' funding decisions (Kuppuswamy & Bayus, 2015) and assuming that the crowd is not a monolithic entity, the present study investigates the impact of backers that intervene at the beginning of the tail of the campaign and the effect of renowned firms that act as mentors of a new project. By segmenting the crowd according to entry time, the findings confirm that early-late backers have a positive impact on the likelihood of a project reaching its capital target. Moreover, by isolating renowned companies from backers who intervene in the funding process, the study shows that this new form of mentoring is a determinant of the success of crowdfunding campaigns.

The paper advances the body of knowledge in several aspects. First, the results identify new signals that have so far not been covered in the crowdfunding literature. In fact, early-late backers contribute to reinforce the deadline effect by focusing on backers who hesitate until the last days or hours of the fundraising window.

Second, the segregation of financial and knowledge capital, which typically characterizes the crowdfunding model, is mitigated by the intervention of companies that can be identified as more experienced backers. Unlike what happens in the lending-model of crowdfunding (Lin, Sias, & Wei, 2015), backers are more likely to participate when an expert investor has already supported a crowdfunding campaign. This new type of mentor expresses more credible judgment about the reliability and feasibility of a project.

Third, our study examines in depth the functioning of reward-based crowdfunding in the Italian context, which is very little investigated and which still has technological and cultural limitations in comparison with other advanced countries such as the US and UK. As demonstrated by the impact of the social network index, the potential for success of the Italian crowdfunding market may increase by reduction of the digital divide that distinguishes Italy from other advanced contexts.

Fourth, since the framework of this study is rooted in the information asymmetry theory and in the theory of signals, the paper further contributes to these research streams by applying these theories in novel contexts and simultaneously providing additional insights into the crowdfunding theory. With regard to crowdfunding, the paper also contributes by updating existing findings on success factors in reward-based crowdfunding and providing additional insights about the behaviour of the crowd.

This study has some limitations that call for future research efforts. The paper attributes the positive relationship between the dynamics of backers and the success of campaigns to several constructs such as social information. Future works should take a step further in this direction by administering a survey among the backers of crowdfunding projects. In addition, the findings should be generalized very cautiously, since the study uses data from only one country. Therefore, through analysis of success determinants across different contexts, additional investigations could provide information about whether backer behaviour differs across cultural contexts.

Notwithstanding the mentioned limits, the paper has interesting implications for both the applicants of crowdfunding projects and the managers of internet platforms. The former should not only monitor the number of earlier advocates, but also make a constant effort to sustain the crowdfunding project along the entire fundraising cycle. In fact, given the critical role of backers at the tail of the campaign, the sense of success represented by early pledges should not lower the guard of the project creator, who must remain vigilant throughout the duration of the campaign. Moreover, both creators of projects and managers of crowdfunding platforms should acknowledge the importance of mentors. Platforms should be designed so as to reserve specific space and evidence for the participation of backers represented by renowned already operating organizations. Moreover, proponents should pay attention to the involvement of remarkable advocates who may act as a positive signal for the success of a campaign. All these factors may further improve capital allocation in a market such as reward-based crowdfunding, which is becoming more mature but is still limited by the presence of information asymmetry.

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Notes

Note 1. The investors in a project presented on a crowdfunding platform are called 'funders' (Mollick, 2014), 'advocates' (Kang & Jiang, 2017) or 'backers' (Colombo et al., 2014). Therefore, the paper uses these terms synonymously.

Note 2. The act of financing a campaign can be divided into a number of time-consuming phases (Colombo et al., 2014): registration on the platform, understanding of the financial terms of the project, activation of the on-line payment method. The money is parked in an escrow account until the campaign is over and its outcome is known.

Note 3. The time fraction equal to one-sixth of a given interval was adopted by Colombo et al. (2014) in their study on early-backers.

Note 4. The projects are classified into the following sectors: Theatre, Publishing, Cinema, Music, Civic, Food, Outdoor, Games and Tech. In order to avoid the 'dummy trap', the logistic regressions include eight dummies out of nine.

Note 5. Data not reported, correlation matrix and variance inflation factors (VIF) are available upon request from the authors.

Appendix A

Content analysis: A comparison between US and Italian platforms

Information	**Platforms**			
Campaign page	**Indiegogo**	**Kickstarter**	**Eppela**	**Produzioni dal basso**
Funding requested	Yes	Yes	Yes	Yes
Funding achieved	Yes	Yes	Yes	Yes
Days to go	Yes	Yes	Yes	Yes
Video/Photo	Yes	Yes	Yes	Yes
Project Description	Yes	Yes	Yes	Yes
Number of backers	Yes	Yes	Yes	Yes
Number of rewards	Yes	Yes	Yes	Yes
Updates/Comments	Yes	Yes	Yes	Yes
Linked Websites	Yes	Yes	Yes	Yes
Proponents	**Indiegogo**	**Kickstarter**	**Eppela**	**Produzioni dal basso**
Biography	Yes	Yes	No	No
Identity verification	Yes	Yes	No	No
Backed/Created projects	Yes	Yes	No	No
Facebook friends	Yes	Yes	No	No
Backers	**Indiegogo**	**Kickstarter**	**Eppela**	**Produzioni dal basso**
Biography	Yes	Yes	No	No
Identity verification	Yes	Yes	No	No
Backed/Created projects	Yes	Yes	No	No
Amount financed	Yes	Yes	No	No

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The Role of Leverage to Profitability at a Time of Economic Crisis

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Abstract

This article examines the assets, liabilities, equity, expenses, sales and profits of the Greek technology sector throughout the period 2008-2015. The author is attempting to interpret the effectiveness and profitability of corporations listed in the Athens Stock Exchange in the context of the recent economic crisis through the concepts of operating leverage and Altman z-score. Our results indicate that the above-mentioned theories can be insufficient, when additional factors, such as the degree of expenses-to-sales adjustment, or a more qualitative approach in financial statements analysis is not taken into account as well.

Keywords: accounting data, profitability, adjusting expenses, sales, Z-score

JEL Classification Codes: G01, G10, G30, M41

1. Introduction

In the present study, we investigate how the profitability of a company, especially in times of crises, is related to its operating leverage an12§6d its ability to adjust its Expenses to its Sales, taking evidence from the Greek technology sector. In particular, our sample consists of the total 20 Société Anonyme (S.A.) corporations listed in the Athens Stock Exchange. The technology sector involves firms, which are either active in software/hardware development, manufacture of electronic devices, or provide services related to information technology. As such, the sector under consideration is characterized by increased flexibility and adaptivity, confronting the new economic reality and related challenges though innovating business activities, which are instrumental in generating new added value. It is widely acknowledged that companies revolving around such enterprises feature high levels of competition, as well as high Research and Development costs. On the other hand, the related products typically have a rather limited life cycle. Therefore, one could argue that the technology sector is among the most representative, when examining Expenses-to-Sales adaptivity, in view of the increased knowledge-intensive entrepreneurship and knowledge-based management involved.

The time frame of interest for the subsequent analysis will be the most recent financial crisis following 2008. The extent to which fixed and variable costs can be adjusted to sales in such periods of crises is of utmost importance and *operating leverage*, i.e. the degree to which total costs may be broken down to fixed and variable costs, constitutes a fundamental concept. A well known measure of operating leverage is the ratio of fixed to variable (or total) costs, while the degree of operating leverage is defined as the ratio of the percentage change in Operating Income (Profit or Loss) for a given percentage change in Sales. For an organization having high operating leverage, a large proportion of the total costs are fixed, hence more sales are required to break even and cover its substantial fixed costs (Vassileiou D., Eriotis N., 2008). This concept is intimately connected to the degree of potential danger the corporation is exposed to. Indeed, a corporation with high operating leverage is more vulnerable, since a potential decline in sales would lead to an even greater (percentage-wise) decline in Operating Income.

The notion of operating leverage has attracted a lot of attention and has been studied extensively. John R. Percival (1974) investigates how substitution of fixed with variable costs could result in exposing the shareholders to increased risk, clarifying the extent to which a corporation might be willing to embark on such a substitution. Dran J.J., Jr. (1991) proved that a significant determinant of the systematic risk of a corporation associated to its operating leverage is not only the ratio of its fixed and variable costs, but in fact the proximity of its operation to the break-even point. The relationship between systematic risk and the degrees of operating and financial leverage has been further investigated by James M. Gahlon and James A. Gentry (1982) in the context of decision-making. More recently, a paper by Graeme Guthrie (2011) on the interplay between operating leverage and expected return concluded that increased operating leverage leads to increased systematic risk and, consequently, to higher expected returns.

In periods of economic crises, most business strategies reduce for many companies to survival tactics. However, the consequences are not uniformly distributed throughout the various sectors and the technology sector in particular is well-known to suffer less negative consequences. According to Vassileiou D. and Eriotis N. (2008), available technology is one of the key determinants of the degree of operating leverage.

Nevertheless, recalling that the statement that "an increase in fixed costs and a corresponding decrease in variable costs would lead to a higher degree of operating leverage" (W. R. McDaniel, 1984) is not universally correct, we also measure the financial health of our selected sample through Altman's *z-score*. This is a well-known multivariate statistical tool, which is commonly used as a predictive bankruptcy model. The z-score is easy to calculate, involving as it does simple data, which are readily available in any company's public disclosures. More precisely, the formula for the z-score is a linear combination involving five financial ratios describing its liquidity, profitability, leverage, solvency and activity. In general, the lower a company's score is, the higher its likelihood of bankruptcy. For example, a z-score above 3.0 suggests financial soundness, whereas a z-score below 1.8 indicates financial distress and could be considered predictive of default within two years.

Therefore, it is of interest to relate the degree of expenses-to–sales adaptivity of a company to its operating leverage and z-score, taking evidence from the Greek technology sector. More precisely, we focus on the total 20 Société Anonyme (S.A.) corporations listed on the Athens Stock Exchange, which comprise the technology sector of the country. This sample has been analyzed from different perspectives in (Papadeas, Rodosthenous, & Katsouleas, 2017) and related results can be found in (Papadeas, Goumas, & Kossieri, 2017). As attested by the financial statements for the period 2008-2015, the profiles of these companies regarding their expenses-to–sales adjustment are extremely varying. In the present study, we isolate 2 subgroups of our sample, each consisting of four corporations, which are characterized by extremely contrasting profiles. The first Group includes only companies presenting *bad* expenses-to–sales adjustment, whereas the second one consists of those companies, which in this respect have proved most successful, presenting *good* expenses-to–sales adjustment. In particular, their members include:

Group 1. Compucon, Ilyda, Intracom and Vidavo

Group 2. Entersoft, Epsilon Net, MLS and Plaisio Computers

These Groups are analyzed as regards their leverage, their z-score and profitability in detail in Sections 2 and 3 respectively. The paper concludes with a discussion on our findings and suggestions for future work.

2. Group 1: Restricted Expenses-To-Sales Adjustment

As mentioned in the Introduction, corporations of both Groups are analyzed with respect to the well-known Degree of Operating Leverage: $\mathit{Operating\ Leverage} = \frac{\mathit{Fixed\ Costs}}{\mathit{Total\ Costs}}$ and the z-score. The latter is a financial distress predictor, which was originally introduced in 1968 by Edward I. Atman for predicting bankruptcy. This empirical equation predicts the risk of corporate failure within two years and involves a specific linear combination of five financial ratios $X_i\ (i = 1,2,3,4,5)$. In particular, the following ratios may be readily calculated based on data retrieved from annual financial reports:

$$X_1 = \frac{\mathit{Working\ Capital}}{\mathit{Total\ Assets}},$$

$$X_2 = \frac{\mathrm{Re}\mathit{tained\ Earnings}}{\mathit{Total\ Assets}},$$

$$X_3 = \frac{\mathit{Earnings\ before\ Tax\ and\ Interest}}{\mathit{Total\ Assets}},$$

$$X_4 = \frac{\mathit{Market\ Value\ of\ Equity}}{\mathit{Total\ Liabilities}},$$

$$X_5 = \frac{\mathit{Sales}}{\mathit{Total\ Assets}}.$$

Hence, the z-score is computed as follows:

$$z = 1.2 \quad X_1 + 1.4 \quad X_2 + 3.3 \quad X_3 + 0.6 \quad X_4 + 1.0 \quad X_5.$$

It should be noted that for privately held companies, which are not publicly traded, the Market Value of Equity on the nominator of X_4 may be substituted with the Book Value or Net Worth. According to its z-score, a company is classified in one of the following zones of discrimination:

i. $Z \quad score < 1.8$. "Distress" zone.

ii. $1.81 < Z \quad score < 2.7$. Possible distress within the next two years.

iii. $2.71 < Z \quad score < 2.99$. Necessity for corrective moves.

iv. $Z \quad score > 3$. "Safety" zone.

It should be noted that this model has led to the development of other scoring models, for instance, for private firms or non-manufacturers and emerging markets, and has been revisited to account for the ever changing financial environment (Altman, 2002).

2.1 COMPUCON

We begin our analysis with COMPUCON, a Group 1 company exhibiting restricted expenses-to-sales adjustment. The evolution of sales and expenses of COMPUCON for the period 2008-2015 is displayed in Figure 1, while the corresponding degrees of Operating Leverage and z-score are included in Table 1.

Table 1. Degrees of operating Leverage and z-scores for "COMPUCON" for the period 2008-2015 (Group 1)

	2008	2009	2010	2011	2012	2013	2014	2015
Leverage	0.72	0.96	0.93	0.89	0.87	0.89	0.94	0.89
z-score	1.14	0.43	-1.08	0.05	-0.34	-0.55	-1.93	-1.42

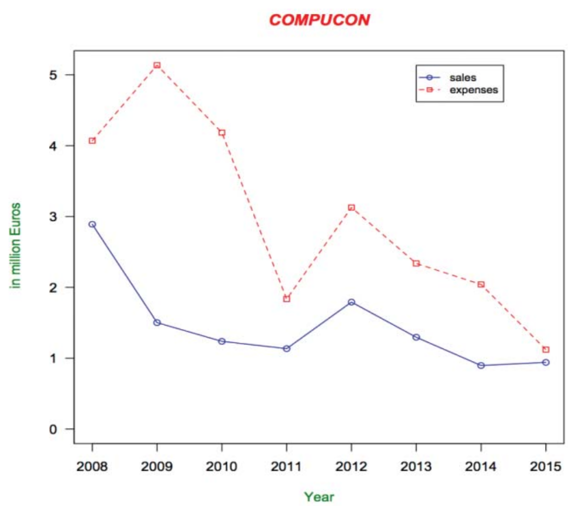

Figure 1. Evolution of Sales and Expenses for "COMPUCON" throughout 2008-2015 (Group 1)

Despite the fact that in 2008, i.e. the beginning of the period under consideration, the liabilities of COMPUCON (7.372.506,61 €) did not exceed its equity (7.487.453,27 €), being in fact of the same order, a geometric increase in its liabilities has been observed during the following years of the financial crisis. Consequently, its constantly increasing degree of financial leverage has made it progressively difficult for COMPUCON to adapt to the new economic circumstances. On the other hand, its z-score has consistently remained less than 1.8, while COMPUCON has been suffering losses for all accounting periods in between the time frame under consideration.

2.2 ILYDA

Continuing with Group 1 companies, ILYDA also showcases restricted expenses-to-sales adjustment for the period 2008-2015, as exhibited in Figure 2, while the corresponding degrees of Operating Leverage and z-score are included in Table 2.

Table 2. Degrees of Operating Leverage and z-scores for "ILYDA" for the period 2008-2015 (Group 1)

	2008	2009	2010	2011	2012	2013	2014	2015
Leverage	0.46	0.56	0.39	0.39	0.85	0.40	0.52	0.33
z-score	4	1.27	1.51	1.58	0.78	-0.76	0.03	0.53

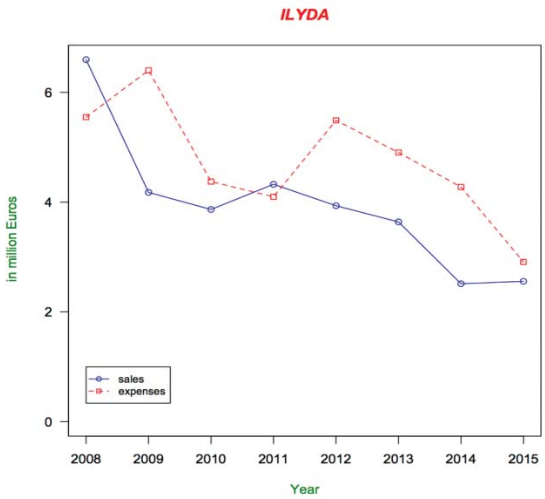

Figure 2. Evolution of Sales and Expenses for "ILYDA" throughout 2008-2015 (Group 1)

In 2008, the Liabilities of ILYDA (2.389.465 €) were corresponding to about 0.2 of its equity (11.522.756 €). However, its liabilities have been progressively increasing throughout the subsequent period of economic crisis, amounting to 1.73 of its Equity in 2015. On the other hand, despite the progressive changes observed in leverage ratios, its z-score has in general not exceeded the value of 1.8. Moreover, throughout the 8 years under consideration, the profitability of ILYDA has been somewhat restricted, the company achieving profits only in years 2008 and 2011 and suffering losses throughout the 6 remaining accounting periods.

2.3 INTRACOM

Figure 3 displays restricted expenses-to-sales adjustment for INTRACOM during the period 2008-2015, while the corresponding degrees of Operating Leverage and z-score are included in Table 3.

Table 3. Degrees of Operating Leverage and z-scores for "INTRACOM" for the period 2008-2015 (Group 1)

	2008	2009	2010	2011	2012	2013	2014	2015
Leverage	0.86	0.82	0.81	0.91	0.91	0.98	0.91	0.75
z-score	9.29	11.62	8.38	5.75	5.16	2.54	4.00	4.20

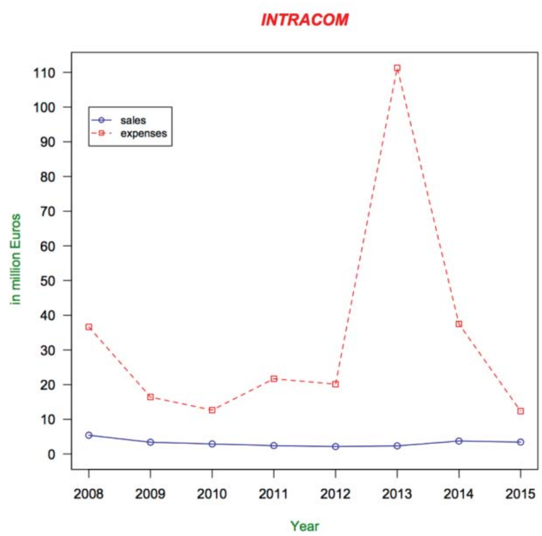

Figure 3. Evolution of Sales and Expenses for "INTRACOM" throughout 2008-2015 (Group 1)

INTRACOM showed negative working capital for the years 2008, 2010-2013 and 2015. Although INTRACOM has been over time characterized by a relatively small participation of liabilities in total capital (having particularly large equity), a general stagnation (and even drop) in sales has been observed. This noteworthy fact may be attributed to particularly poor expenses-to-sales adjustment. The increased (inelastic) degree of leverage has paradoxically been combined with increased z-scores, while the company has been consistently suffering losses throughout the time frame under consideration.

2.4 VIDAVO

Figure 4 displays restricted expenses-to-sales adjustment for VIDAVO during the period 2008-2015, while the corresponding degrees of Operating Leverage and z-score are included in Table 4.

Table 4. Degrees of Operating Leverage and z-scores for "VIDAVO" for the period 2008-2015 (Group 1)

	2008	2009	2010	2011	2012	2013	2014	2015
Leverage	0.30	0.00	0.42	0.59	0.78	0.50	0.68	0.80
z-score	3.52	17.74	2.30	2.53	-0.56	3.05	2.93	2.75

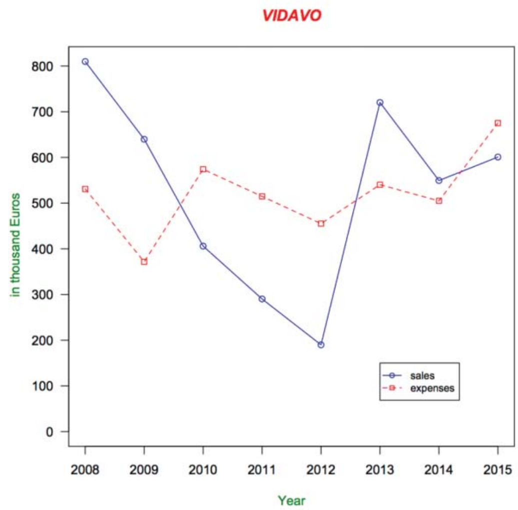

Figure 4. Evolution of Sales and Expenses for "VIDAVO" throughout 2008-2015 (Group 1)

Throughout the time frame under consideration, VIDAVO has been showing a rather awkward evolution in its expenses-to-sales adjustment, degrees of operating leverage, as well as z-score. At the same time, the ratio of its liabilities to its equity has assumed thought this 8-year period the following values: 0.57 – 0.42 – 0.44 – 0.31 – 1.13 - 0.72 – 0.62 – 0.45 successively. On the other hand, the company has not been consistent regarding its profitability, presenting somewhat mixed results: VIDAVO suffered losses in 4 periods (2010-2012, 2015), being profitable in the remaining 4 years (2008, 2009, 2013, 2014).

3. Group 2: Increased Expenses-To-Sales Adjustment

3.1 Entersoft

We begin our analysis of Group 2 companies (exhibiting increased expenses-to-sales adjustment) with ENTERSOFT. The corresponding evolution of sales and expenses for the period 2008-2015 is portrayed in Figure 5, while the degrees of Operating Leverage and z-score are included in Table 5.

Table 5. Degrees of Operating Leverage and z-scores for "ENTERSOFT" for the period 2008-2015 (Group 2)

	2008	2009	2010	2011	2012	2013	2014	2015
Leverage	0.64	0.61	0.52	0.53	0.53	0.62	0.63	0.59
z-score	4.74	3.97	4.77	4.48	4.33	3.98	3.77	4.77

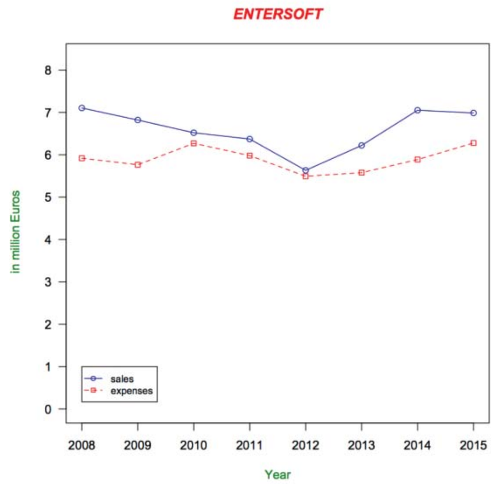

Figure 5. Evolution of Sales and Expenses for “ENTERSOFT” throughout 2008-2015 (Group 2)

ENTERSOFT has achieved good adjustment of its expenses to its sales. Its long-standing high participation of equity in total assets (around 75%) is in harmony with the relatively large participation of fixed costs in total expenditure (operating leverage). Altman’s z-score has consistently been greater than 3, while the company has remained profitable for the whole period 2008-2015.

3.2 Epsilon Net

Figure 6 displays increased expenses-to-sales adjustment for EPSILON NET during the period 2008-2015, while the corresponding degrees of Operating Leverage and z-score are included in Table 6.

Table 6. Degrees of Operating Leverage and z-scores for “EPSILON NET” for the period 2008-2015 (Group 2)

	2008	2009	2010	2011	2012	2013	2014	2015
Leverage	0.56	0.64	0.51	0.36	0.32	0.44	0.50	0.48
z-score	2.10	2.02	2.06	2.07	5.25	3.37	3.37	3.15

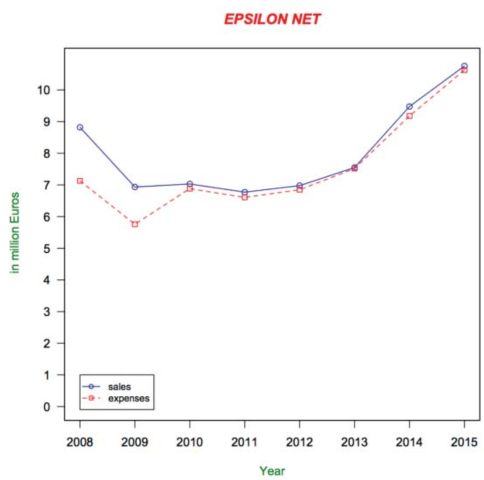

Figure 6. Evolution of Sales and Expenses for “EPSILON NET” throughout 2008-2015 (Group 2)

EPSILON NET has achieved an even better adjustment of its expenses to its sales. Its relatively smaller degree of operating leverage, along with the consistently healthy participation of its equity in total assets (more than 50%) shows the company’s ease of adjustment to the new economic circumstances. According to Altman’s analysis, when the z-score does not exceed the threshold of 2.7 (as was the case for the periods 2008-2011), the corresponding firm is likely to go into bankruptcy within two years. However, limitation of its liabilities level (from 5 654 418 € in 2011 to 3 655 819 € in 2012), along with other corrective actions, has led the z-score beyond the threshold of 3 (“safety” zone) for the subsequent years 2012-2015, while the company has remained profitable for the whole period 2008-2015.

3.3 MLS

Figure 7 displays increased expenses-to-sales adjustment for MLS during the period 2008-2015, while the corresponding degrees of Operating Leverage and z-score are included in Table 7.

Table 7. Degrees of Operating Leverage and z-scores for "MLS" for the period 2008-2015 (Group 2)

	2008	2009	2010	2011	2012	2013	2014	2015
Leverage	0.25	0.33	0.42	0.39	0.42	0.42	0.28	0.22
z-score	1.99	3.49	3.17	2.31	3.01	2.42	3.44	14.83

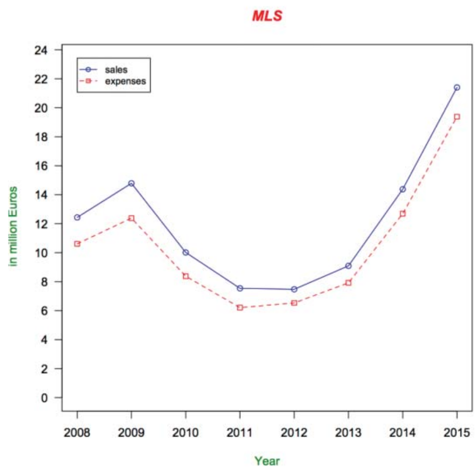

Figure 7. Evolution of Sales and Expenses for "MLS" throughout 2008-2015 (Group 2)

MLS has achieved an impressive expenses-to-sales adjustment throughout the period 2008-2015. This increased adaptivity is harmonically combined with a small degree of operating leverage in a period of financial crisis. The liabilities of MLS have been restricted from 8 357 329 € in 2011 to 5 981 430 € in 2012. Furthermore, the z-score has achieved satisfactory values, while the company has remained profitable for the whole period under consideration.

3.4 Plaisio Computers

Figure 8 displays increased expenses-to-sales adjustment for PLAISIO COMPUTERS during the period 2008-2015, while the corresponding degrees of Operating Leverage and z-score are included in Table 8.

Table 8. Degrees of Operating Leverage and z-scores for "PLAISIO COMPUTERS" for the period 2008-2015 (Group 2)

	2008	2009	2010	2011	2012	2013	2014	2015
Leverage	0.17	0.16	0.17	0.21	0.19	0.20	0.20	0.20
z-score	3.84	3.70	3.89	3.96	4.08	4.47	4.97	4.29

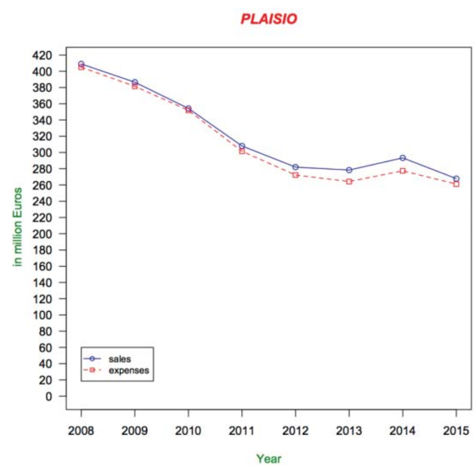

Figure 8. Evolution of Sales and Expenses for "PLAISIO COMPUTERS" throughout 2008-2015 (Group 2)

PLAISIO COMPUTERS has been the corporation with the best expenses-to-sales adjustment throughout the period 2008-2015. This company is also characterized by a very large contribution of variable costs to total expenditure (i.e., very low operational leverage). Hence, it is more efficiently adaptive in the uncertain circumstances of economic crisis. Although at the beginning of the eight-year period it began with double the amount of liabilities than that of its equity (2008, 2009), PLAISIO managed to gradually reduce them to close to 0.6 of its equity for the years 2014, 2015. Also, despite the long-term decline in sales (excluding 2014), the continuing decline in variable costs has contributed to sustained profitability and, in parallel, to a particularly good level of z-score.

4. Conclusions

Recall that in all four Group 1 companies analyzed in section 2, it was observed that a failure to adapt expenses to sales was associated with a loss-making effect over the whole or majority of the 8-year time frame under consideration. However, the corresponding fluctuations in liabilities, degree of operational leverage and Altman z-score which have been observed over time show differences that require further analysis and interpretation, as shown in the following Table 9:

Table 9. Group 1 Summary: Adjustment, Result, Degrees of Operating Leverage and z-scores (2008-2015)

	Compucon	Ilyda	Intracom	Vidavo
Adjustment	No	No	No	No
Result (8 years)	Losses 8/8	Losses 6/8	Losses 8/8	Losses 4/8
Liabilities	High	High	Low	Fluctuating
Operational Leverage	High	Fluctuating	High	Fluctuating
z-score	Low	Low	High	Fluctuating

On the other hand, all four Group 2 companies analyzed in section 3 have combined increased expenses-to-sales adaptivity with profits throughout the 8-year period. Nevertheless, in these instances as well, the corresponding over time fluctuations in liabilities, degree of operational leverage and Altman's z-score show differences that require further analysis and interpretation, as suggested by the following table 10:

Table 10. Group 2 Summary: Adjustment, Result, Degrees of Operating Leverage and z-scores (2008-2015)

	Entersoft	Epsilon Net	MLS	Plaisio Computers
Adjustment	Yes	Yes	Yes	Yes
Result (8 years)	Profits 8/8	Profits 8/8	Profits 8/8	Profits 8/8
Liabilities	Low	Low	Low	Low
Operational Leverage	High	Medium	Low	Low
z-score	High	Medium	Medium	High

More generally, the large, small or fluctuating participation of the liabilities in the total assets, as well as the high or low degree of operational leverage, as well as Altman's z-score, constitute important parameters, which affect the operation of any company. This, however, is not to suggest that the impact of the aforementioned factors on profitability can be ascertained with ease. Within the period of the most recent financial crisis under consideration, COMPUCON has been suffering losses for the whole 8-year time frame, INTRACOM for 6 years, while the losses of ILYDA and VIDAVO have been restricted in 4 periods in between. It becomes clear that a large level of liabilities may either be a disadvantage, in cases of redemption inability, or an advantage when they arise due to high credit standing. Furthermore, the gradual reduction of liabilities (encountered in EPSILON NET, MLS and PLAISIO COMPUTERS) allows for a progressive independence from lenders. Consequently, more effective policies can be applied, both in the type and the level of commissions, as well as in pricing and sales discounts. In this way, companies find it easier to maintain and even increase their market share, even in times of economic crisis.

From another point of view, the large contribution of fixed to total costs (operating leverage) can either be a disadvantage (for instance, in case of ever decreasing sales, when expense adjustment becomes more and more difficult) or advantageous (for instance, in cases when sales are expected to rise, leading to lower sales cost per unit). We recall that the relative risk is determined by sales level, by the contribution of fixed costs to total costs, and by the participation of variable costs in sales. Also, operational leverage is not only determined by the above-mentioned (percentage-wise) contributions, but also by the extent to which the sales level is close to or near the break-even point. Indeed, the latter is largely determined by technology and can be increased by appropriate investment budget decisions to improve profitability.

Similarly, the z-score is also affected by the percentage contribution of aforementioned factors, such as liabilities (or equity) to total assets or costs (fixed or variable) to total expenses to yield the final result (profit or loss). Consequently,

1) operational risk theories for choosing the best percentage-wise participation of fixed and variable costs in total expenditure, as well as

2) Altman's z-score analysis are not verified, when they additional factors and approaches are not taken into account as well. Such factors include:

a) Expenses-to-sales adjustment, especially in times of economic crisis (2008-2015) and

b) Qualitative interpretation and justification of the participation ratios of various accounting data, including assets, equity and liabilities allocations and structures.

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Developing a Digital Currency from an Islamic Perspective: Case of Blockchain Technology

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Abstract

Numerous studies ranging from concept papers and reviews were conducted on the matter of blockchain and digital currencies. However, those two areas are not well researched due to its being a new area of research. Furthermore, the research on blockchain applications in the Islamic financial system precisely the potential of digital currency in providing a better alternative to current fiat money system which will be the scope of this article. The aim of revolves around exploring the potential and capability of introducing a digital currency that fulfills the Islamic law (*Shari'ah)* functions of money and provides a more stable currency than fiat money. The method used for analyzing this object includes a library research on related topics that helps understanding the functions of money and digital currencies and study of several cases that can assist in fulfilling the objectives of this paper in introducing an Islamic digital currency through detailed research of Islamic theory of money and civilization as well as the developments of blockchain, our findings point towards the ability of introducing a *Shari'ah*-compliant digital currency if all the issues on validity are addressed and resolved. However, the area of digital currencies and blockchain requires further research from a *Shari'ah* perspective to facilitate a better understanding on the topic.

Keywords: digital currencies, Islamic finance, functions of money, Islam, blockchain

1. Introduction

Several decades ago, Islamic finance was introduced in a more official way and since then, it showed an enormous growth prospect. Applications of *Shari'ah* compliant financial and banking services proved success since its introduction drawing several efforts into regulating its activities to serve the best interest of participants in the industry. Islamic banking and finance framework is drawn from the revealed knowledge of the primary sources in Islamic consisting of Qur'an and Sunnah of the Prophet Mohammed (SAW). Hence, its applications are permissible unless it is proven to contradicts *Shari'ah*. In general, the Islamic financial system differs from its conventional counterpart since the first prohibits any activities that involves the three elements of interest (*Riba*), Ambiguity (*Gharar*) and Gambling (*Maysir*). These three elements should not be presented in any contract or transaction in Islamic banking and financial industry or in Islamic economic system. Money and the concept of currencies is considered of the main elements building a financial system since it is used as a payment system to settle transaction in the financial system as well as everyday life. Nowadays, our currencies are based on the concept of paper money in which the central bank print it and control its circulation in the economy through what is known as a monetary policy.

The real issues of fiat money started rising particularly after the dissolvement of Bretton woods agreement that used to peg the U.S currency to the price of Gold. Since 1973, the paper money issued holds no intrinsic value rather than it is backed by the trust of the public in their government ability to control its circulation to achieve economic stability and prevents high inflation causing the currency to devaluate. However, until this day, fiat money proved its inability to be a store of value which is one of the primary functions of money. This issue leads to questioning the ability of paper money to be considered compatible to Islamic requirements in a currency. in addition to that, Islamic recognizes only commodities with an intrinsic value as a currency such as gold and silver which paper money does not hold such attributes leading several scholars to deem it to be non-compliant to *Shari'ah.* Furthermore, several literatures discussed the effect of fiat money on the economy and the financial system leading to uncontrolled inflation and financial crises. issue Since the start of technological era, several innovations have changed the way we perceive things.

One of the major innovations that is believed to be changing the economy and the world is blockchain. Blockchain first appearance was in a paper issued by Nakamoto (2008) that was used as a public ledger for the famous currency called “bitcoin”. since then, blockchain application extended further than being a ledger for currencies and impacted several aspects of the economy and financial services sector. The advantage of blockchain in digital currency can extend to developing a more transparent and secure payment system. its efficiency and ability to be used by everyone made its application to be reachable by many unbanked individuals leading more people to be included in the economic and financial activities. Henceforth, we argue that digital currencies could serve the world and the economy more than the concept of paper money.

However, there are still some issues concerning digital currencies that hinders it from being a currency that is compatible with Islamic requirements for a currency, the main issue of digital currency that it still miss the ability to provide a clear intrinsic value or a physical existence which is required by *Shari’ah.* Hence, the object of this paper circles around investigating the abilities of digital currencies and the concept of blockchain to serve as an Islamic digital currency. to understand how digital currencies can serve as an Islamic digital currency. a historical investigation on the origins of money in Islam is to be done. Hence, since Gold was the main currency within the Islamic civilization, studying its salient features will produce the features needed to produce an Islamic currency. further study is done to uncover some of the issues in digital currencies that hinders its applications to comply with *Shari’ah* and find solutions from current cases on the topic of digital currencies.

2. Literature Review

The concept of money has been in a circle of discussions in the past decades particularly after the introduction of trust based fiat money and leaving the gold standard behind. Money is considered to have several definitions but circle around a similar concept. According to Lim & Sriram (2003), The question of definition of money has been a subject of disagreement for many years and several economists proposing different financial assets to be considered as money with no single definition to be universally accepted. From an Islamic perspective, money is considered as medium of exchange and measurement of economic value. However, it is not a type of commodity that can be traded and expect a return of it without engaging it in a productive activity (Omar, 2011). It is believed that the current monetary system is using the wrong type of monetary instrument causing several issues in the economy. According to Greco (2009), The current system is providing a wrong type of economic growth since it is out of control and in the wrong places generating greater gap of power and wealth that is harming the lives of people. The focus on the topic of Gold comes mainly from several arguments that discusses the importance of gold and having a currency of intrinsic value and how it can prevent and keep the economic safe from crises other issues as inflation. Other researchers believed that introducing an Islamic Gold Dinar (which is a gold currency) in the meantime has no practical value since it cannot control the inflation level and may cause a global unshared ambiguity (Cizakca, 2011). In the past decades, most of the literature focus went towards Gold as a better alternative to fiat money since few of practical alternatives are there to use. According to Chapra (1983), The monetary policy in Islamic Economic helps in achieving socio-economic goals which Islamic placed emphasis upon.

It is argued as well that the current monetary policies are based on conventional monetary theory that have several flaws because it includes secular reasoning where the other Islamic analysis model is based on *Shari’ah* and not man’s reasoning alone (Abdullah, 2016). Hence, it is important to look for alternatives that serve the Islamic functions of money better than the fiat money such as what is known as alternative currencies. Alternative currencies can be found in several regions and with unique features depending on the environment and purpose it serves. The highlight of these currencies can be seen as digital currencies. it is claimed that bitcoin (and blockchain based currencies) promise capacity to solve many concerns such regulatory institutions influence and interpersonal trust (Maurer, Nelms & Swartz, 2013). The underlying concept of digital currencies known as blockchain can be described as follows “blockchain consists of three main, complementary parts: a shared state, a set of rules for updating state via blocks and a trust model for timestamping.” (Williamson, 2015). From what is tracked, blockchain is a type of mutual distributed ledgers and its function allows user to track, record and verify all the transactions in network to ensure its validity and security. It is hence a decentralized database. In the case of blockchain of Bitcoin, it is a cryptographic ledger shared among all the users on the network to verify transactions and add them to a block of other chained transactions to ensure the integrity of transactions and avoiding issues such as double spending (Mainelli & Smith, 2015).

The Concept of applying Blockchain and relevant technologies to establish a well-developed and protected digital currency can be of a major value to discover new opportunities or enhance current features of the economy and monetary policies. However, it is still a viable issue of that current digital currencies is fully decentralized in which government does not look to it in a promising way since it cannot be manipulated to control certain economic outcomes. The case of virtual and digital currencies is that they cannot be considered as a legal tender by the monetary authorities which created several challenges such as its interaction with the real economy, protecting the consumer from any issues associated with these currencies and crimes and fraud that happened by using these currencies since it is not monitored or properly regulated by a suitable monetary regulation (Zahudi & Amir, 2016). Hence, it might be a kind of opportunity to look the potential of regulating these currencies and their respective payment technologies. It may look like it defeats the purpose of decentralized currencies but it still can be of a massive potential to regulate it to a certain degree to protect the interest of the public.

When bitcoin is compared to gold, several similarities were observed and recent discussions proposed that bitcoin carry the responsible features of gold and might be a more practical alternative to modern currencies than gold. Haubo and Dyhrberg (2016) compared as well the difference ability of Gold, Bitcoin and USD in risk management and concluded that bitcoin is classified between gold and USD. It seems that the features which gravitates people towards physical gold or to digital currencies (Bitcoin as example) to be closely related in several aspects.

It was noticed that the literature of Bitcoin and Digital Currencies are rare when it comes to its development and concept under the Islamic financial and banking system in general. The reason may entail the ambiguity surrounding bitcoin and other relevant digital currencies and if they fit the criteria of being an Islamic currency which there isn’t that much of literature that discusses its nature and Islamic requirements regarding it. according to a paper by Singhal and Rafiuddin (2014), it discussed that bitcoin “roughly” fits the requirements to be defined as money in Islam since is it abundant, freely obtainable, and durable as well. they argued that with proper control, digital currencies can serve as a good alternative and be compatible with the teaching of Islam. The issue of literature is described by Evans (2015) “IBF is still a work-in-progress. Disagreement continues among proponents and outside observers concerning the distinction between what is permitted (*halal*) and what is forbidden (*haram*) under different interpretations of Islamic Law (*Shari’ah*). Adding to the confusion is the desire of many Islamic banks' executives and customers to integrate those banks into the global banking and financial system”. It is discussed as well by (Zahudi & Amir, 2016) that electronic currencies are considered nowadays as a type of fiat money in which some of the views accepted it to be a medium of exchange despite the controversial arguments on fiat money and its comparison to gold and silver. This article will aim towards investigating the ability of Digital currencies and its blockchain systems to be integrated as an Islamic currency in which if it is applicable to fit the criteria of Digital currencies into *Shari’ah* requirements regarding functions of money and solving current issues hindering its progress towards that goal.

3. Methodology

The primary objectives are to identify and research specific aspects on digital currencies and the blockchain to identify its potential, build a comparison to other options and find some ways to integrate into an appropriate model that can be compatible to Islamic monetary system. several analyses are sought to define the current flaws existing in digital currencies and what are the solutions available to solve these issues. Hence, the methods used will follow a library research which will seek to identify the level of digital currency compatibility with Islamic practices and issues revolving around the topic. Furthermore, this paper will pursue a case study involving specific applied cases that attempted to address and solve some of the issues presented in digital currencies from different angles. Hence, providing a comprehensive image on how integrating these cases together can help in developing an Islamic digital currency model. Case study research assist in targeting a specific phenomenon to further explain it within its real-life context. The design of this paper aims to investigate several historical cases as well to make a generalized conclusion on this topic. Even though this is a qualitative research, an empirical evidence might be presented from other literature to provide a better conclusion on the topic since a topic of monetary and economic impact such as digital currencies must be reflected in empirical and theoretical evidences. Since the goal of this research is heading for a relatively new area of research in which two issues must be considered. First, is that Digital currencies and blockchain development is a bit of new research topic especially after the development of the world’s most known digital currency Bitcoin. therefore, there are still several ideas and issues to be addressed in specific regarding this topic. Furthermore, Islamic perspective on Digital currency is still an under-developed area where not much of examination and research is done on it. for both issues, choosing a case study and library research methods seems more appropriate because the emphasis should be aimed towards building a better understanding on the topic rather than observing the awareness on it in which it is not expected to yield a better understanding towards developing digital currencies from and Islamic Perspective.

4. The Islamic Monetary Theory

It seems that the theory of money and its origins goes back to more than what is historically remembered. Long before the concept of money, the barter trading system existed in which people trade commodities they have for commodities they need. However, in a basic sense, it is easy to realize that such concept does not carry much efficiency since it is not easy to match the gap between the commodities available and commodities needed which is called a double coincidence of wants. Henceforward, the concept of money was introduced to solve these issues that existed in the barter trading system. Mankind used several things ranging from shells, stones, metals such as gold and silver and reaching to the current monetary system known as the fiat money.

However, In the modern societies, fiat money does not represent a real value in its own design rather than a mere unit of account to represent the value of commodities and it is quantity is supplied and controlled by the central bank of each country in which the bank controls it through monetary policies to achieve economic stability. However, it seems different from some of the past units used as money since assets such as gold and silver were used as money and carried an intrinsic value it is content and its existence is limited in which it cannot be produced on demand comparable to the fiat money existed in the modern economic system. Henceforth, the need for a medium of exchange with certain functions to facilitate trading established and carried specific functions which are mainly categorized under three main aspects: medium of exchange, unit of account and to store value. Money had other criteria with time that made it a proper medium of exchange such as it measurability, durability, mobility, and divisibility which made it easier to simplify dealings.

Fiat money nowadays seem to carry controversial resolutions between Islamic jurists. The first opinion goes towards the resolution that fiat money is not *Shari'ah* compliant since it creates purchasing power value from nothing and with the increase of its supply follows an inflation and loss of value of currency leading to other harmful socio-economic problems such as poverty and wealth gap. The other opinion factors fiat money to be *Shari'ah* compliant since the central bank issuing the currency follows the objectives of government and it can control and preserve its value. They argue that even that fiat money is not of convenience, it still serves its objectives acting as money (Kamar et al, 2016). The Islamic fiqh academy of the Muslim world league issued a *Shari'ah* resolution regarding the nature and usage of paper money. It concluded that paper currency is an independent form of money and the rules applying to gold and silver apply to it as well. in resolution 9 D/3/07/86, the OIC Fiqh Academy decided that paper currency is a legal tender that have full qualities of a medium of exchange and the rules applying to gold and silver are applied to it.

Despite the controversial issues of Muslim scholars on fiat money, there are still so many issues attributed to it that makes lose its value and trustworthiness overtime. Abdullah (2016) argued under several examples that fiat money is merely backed by deb. The following table represents the monetary balance sheet of the Malaysian Ringgit as at 31sth Dec 2014

Table 1. Monetary Balance sheet of the RM as at 31st Dec. 2014

Assets		Liabilities	
Gold	5.2	BNM Currency 68.2	
IOUs to Banks 1,548.6		Bank Deposits	1,485.6
	1,553.8	M3	1,553.8

Source: Abdullah (2016)

As represented in Fisher equation:

$MV = PY$

it can be clearly seen that more supply of money (M) will increase the general prices which means more of (P) compared to Output (Y) leading to an inflation which is basically more money chasing the same amount or fewer goods. When it is measured by the U.S dollars, it is noticed that the U.S dollars is losing its value overtime. A measure of this observation can be monitored by using an inflation tracker which despite the initial fluctuation, the U.S dollars kept losing is value due to inflation until this day.

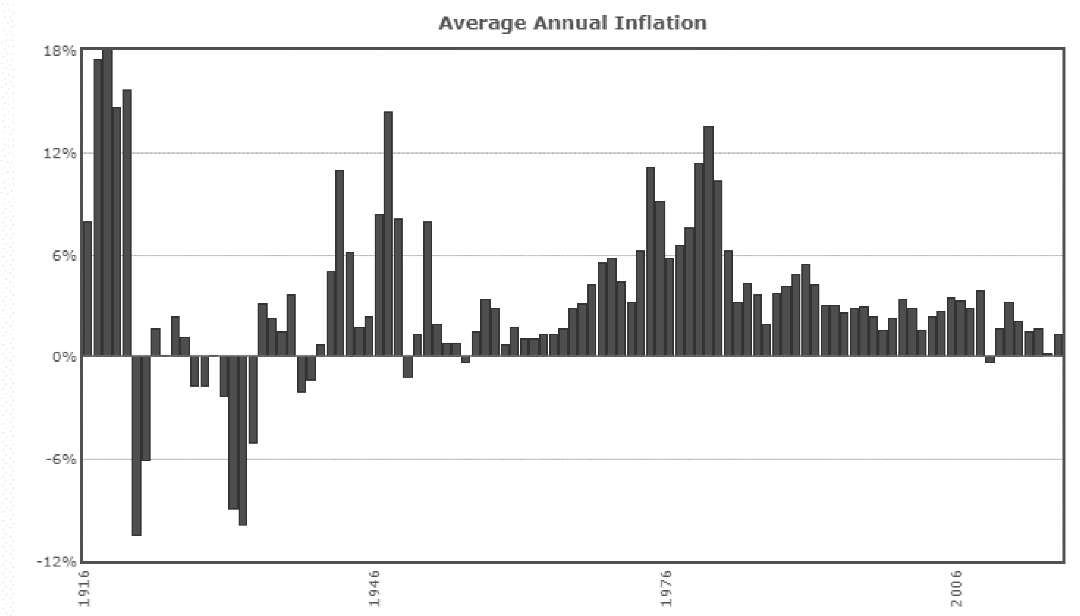

Figure 1. USD annual inflation rates

It is discussed by many that from an Islamic perspective, Fiat money does not fall in line with Maqasid al-*Shari'ah* due many factors even though some scholars may allow its usage for reasons of necessity. According to Meera & Larbani (2009), the seigniorage of fiat money is considered a mere *Riba* and commodity monies such as gold and silver are *Shari'ah* compliant and goes in line with its objectives. In the past decades, new innovations from the development of digital currencies that are based on a more solid foundation of supply and store of value is giving a sign to a better development of a more stable currency options that are immune to inflationary effects and market manipulation. Digital currencies particularly the ones based on blockchain technology proved to supply a better mechanism for money supply, inflation control and succeeded in achieving other socio-economic objectives such as accessibility to financing and transparency.

5. The Supremacy of Gold as an Islamic Currency

When it comes to the definition of Islamic monetary theory, it seems that the arguments presented by classical Muslim scholars on the Islamic theory of money is consistent contrasting to the opinion of modern scholars (Abdullah, 2016). However, classical scholars favored gold and silver as an Islamic currency. Ibn Khaldun mentioned the functions of gold and silver as well in his book "*Muqaddimah*" as money "God has created the two metallic stones of Gold and Silver as a value for everyone to use in trading." Furthermore, AL Ghazali mentioned in his book Revival of Religious Science that "God Almighty created them to turn them between hands, and to be a judge between money with justice, and to another wisdom, which is to beg them to all other things, because they are dear in themselves, and have no purpose in themselves, and attributed them to all other things as one proportion.". In which he indicates that the currency cannot be used as a commodity traded for a price but as a medium of exchange only. It is hence seen that controversial to modern Islamic scholars, classic scholars insisted on using Gold and Silver as a currency and treated it as a pure medium of exchange and has no value which eliminates the concept of earning interest on it under the justification of time value of money. Gold seems to hold an immense value as a currency on its own for reasons beyond the concept of it being a valuable currency in Islamic history. Gold has been in circulation as a money even before the Islamic civilization. Furthermore, several analyses that compared gold to a fiat currency showed it superiority over the latter one. According to Abdullah (2013), the nominal price of gold in the United states acted as a hedge against inflation during the time of fiat standard in the U.S particularly between 1971-1979 and then the gap widens a bit from 1990 forwards.

6. Viability of Developing a *Shari'ah* Compliant Digital Currency

With the blockchain and Digital currencies becoming more known to individuals by the day, more literature is getting published with concepts that is signaling a comprehensive transformation on several aspects of life that includes political, social, and financial aspects with countless opportunities and solutions to existing problems. Aside from it being the core concept of digital currencies, it helped transform the financial system by giving it a better tool to integrate more integrity, transparency, and trust in it through the nature of Blockchain. The potential of digital currencies and blockchain is seen to be enormous. However, most of the literature that discusses implementing are pursuing the easier means of claiming that bitcoin and its payment system is *Shari'ah* compliant since it is better alternative than fiat money and under the rule of necessity. This argument holds truth to some extent since fiat money in its core value does not hold complete compliance with *Shari'ah*. However, bitcoin and conventional digital currencies still have some issue in compliance with *Shari'ah* mainly with Digital currencies holding no physical intrinsic value. Through Islamic history, Islam recognized commodities with intrinsic physical value only to be considered as money. and the second issue is regarding its practicality in today's societies where governments requires full control over the monetary supply to control economic conditions and keep it stable.

The authenticity of blockchain to be following *Sharia'h* in brief can be discussed by inspecting if it contains any elements of prohibition in Islam. From previous discussions on blockchain, it is known that blockchain security include public key cryptography and follow a decentralized network approach instead of one server to record and verify transactions. The argument presented here is that in its concept and content, the concept of blockchain consists of computational and mathematical applications with no prohibited elements within its content. Furthermore, it does serve to eliminate prohibited elements such as *Gharar* (ambiguity) from transactions since its verification process is strong and transparent for all participants on the network.

The first issue concerning digital currencies is in its being a fully decentralized currency where no one can control its supply or verification process. Governments nowadays are proposing some ideas to include digital currencies such as blockchain within specific regulations to promote its development. However, most of governments are discouraged to promote it and even some rendered its trading to be considered as a legal activity. The fear from allowing bitcoin and other digital currencies can be due to several elements. The governments are known to control the supply of paper currency in the economy through what is called "Monetary Policy" where money injects money or withdraws it from the economy to influence spending and investing resulting in more jobs and stabilizing inflation. The case if slightly different in the case of digital currencies adopting blockchain technology. Blockchain verifies all the transaction through miners consisting of computers solving complex mathematical algorithms to verify transactions and avoid double spending issues. Hence, banks are not needed to verify these transactions and cannot control the supply of digital currencies which seems to cause an issue for governments. According to Zahudi & Amir (2016), "Virtual currency is still a largely uncharted and unsupervised area, and so far, no protections are likely available to the consumers that become involved with virtual currency if something goes wrong".

In the past couple of years, one of the interesting ideas were introduced by Danezis & Meiklejohn (2015) which is called "RS Coin". The aim of this concept is to introduce some centrlization in the currency specifically in the process of generating money and verifying transactions to achieve best objectives combining advatnage of cryptocurrencies and stability of proper government control. Thier paper introduces an altenrative to bitcoin miners named "mintettes". However, they serve a similar object as miners which is maintaining the transaction ledger but they use different approach. Miners verify transactions through solving computationally difficult tasks where mintettes are authorized from the central bank to collect and maintain transactions in ledgers.

The second point regarding developing a a digital currency from an Islamic perspective revolves around the issue of digital currencies not having an intrinsic value compared to commodity money such as gold and silver. Several literatures may have argued that the mining process (in the blockchain) is creating the value for the bitcoin and digital currencies and since there is an effort in issuing the currency, it holds a value for that currency. However, we still cannot find a physical existence of that currency that backs it up and hold its value in the real world which still cause an issue in the definition of money from an Islamic perspective.

One of the solutions can be observed through attaching a physical commodity to backup digital currencies in the real world. To observe both requirements of having an intrinsic value for a currency and solve existing issues presented in the digital currencies such the volatility of its value over brief period, Gold can be observed as a decent commodity to be the backup physical existence of Digital currencies. This move will solve two key issues in digital currencies, first is the volatility of digital currencies prices since the gold prices are much more stable. Second is establishing a clear physical existence to the currency to back it up which will not allow the currency prices to be manipulated as seen in the fiat monetary system. Other important objectives will be achieved like trust in the currency. People are expected to gain trust in such a currency much faster than normal digital currencies since it is backed by gold which the public trust that it will preserve its value over time.

In May 2017, a technology company in Dubai called "One Gram" has issued the world's first gold backed digital currency. It is like bitcoin since it was created using the blockchain technology and each coin is backed by one gram of Gold. According to their website (One Gram), they collaborated with a gold trading company "Gold Guard" and started an initial coin offering consisting of 12,400,786 coins. One of the salient features is its stability since its linked with gold which sets a floor for the price of the coin that equals the price of Gold (1g). the currency grows in value since 70% of transactions fees will be reinvested to purchase more gold to increase the amount of gold backing up every coin in which the owners will share the profit from it.

Lastly, digital currency should be examined to see if it can achieve objectives of Islamic Law (*Maqasid al-Shari'ah*). Islamic Law (*Shari'ah)* listed 5 main higher objectives to be protected and preserved. One of the objectives is recognised as Preserving Wealth (*Hifz al-Mal).* There are several ways of preserving wealth in Islam. Wealth in Islam can be preserved through pursuing work and earning through permissible transactions and trading activities. Harmful activities such as theft, ambiguity, gambling, and interest are prohibited since it leads to destruction of wealth. Hence, involving in any activities that destroys wealth is prohibited. furthermore, adopting a currency that loses its value over time leads to the same conclusion of wealth destruction and any currency that loses its value over time does not serve the function of money as a store of value. Hence, the way fiat money is created through the debt and fractional reserve system not only will oppose the objectives of *Shari'ah* but cause a move away from it (Meera & Larbani, 2006). By examining a digital currency that is modified to according to the cases that were discussed, it will be assumed to achieve the objective of preserving wealth since its creation is not based on debt or fractional reserve system which will protect it from losing its value especially if it is linked to a stable physical commodity such as Gold. It is also secure and transparent which will lead to elimination of any ambiguous or harmful activities. Transparency will also make the central bank clearer on its policies in creating more currencies and it will be constrained to the actual physical intrinsic value of it.

7. Recommendation

More research is still needed in several areas concerning blockchain and digital currencies. Blockchain and its application is considered a new niche that needs more literature consisting of analyzing flaws and issues with applying it in today's economy and other related areas as well as producing new concept papers that will provide more ideas or solve current issues in blockchain or the how the blockchain will solve existing complications occurring in the global economy and financial sector. Various types of literature on concepts applied by blockchain to several sectors such as insurance, banking and financial sectors showed an impressive potential of such technology but it is still under researched and needs more focus. The second area is digital currencies. This area needs further understanding and research on its role in developing payment systems and the current monetary policies.

When it comes to practitioners' role in developing the concept of blockchain and digital currencies, several roles are needed. First is learning more on the literature providing more concepts every day on blockchain and digital currencies. The next step would be willing to invest in such startups since it will provide more interest in researching if the industry is well invested in and promotes for more innovations. The gap between capital and ideas are causing a significant proportion of great ideas to stay on paper where it could change our perspective on economy and finance. Managers should be involved in following the advancement in such technologies since it is making new jobs with countless benefits to the market. Being well connected to the literature makes moving new ideas to practice an easier task creating more innovative environment in the market since one of the biggest challenges is the gap between theory and practice. In hope of that this research will assist in pledging more effort into developing more concepts on digital currencies, blockchain innovations and integrating Islamic values in them.

8. Conclusion

The past few decades have shown a comprehensive involvement in a new era of technological advancement. Those innovation have changed the perception of how economy and the world is perceived. Most of the literature are focused on the potential of blockchain in transforming the economy specifically the banking and financial sector. Blockchain promises several features including transparent, trust less and efficient environment for all types of economic and financial activities. However, this paper focused on the concept of blockchain in the development of the monetary system particularly currencies. This research investigated the development and potential of digital currencies backed by blockchain in transforming how currencies are perceived. To be more specific, this paper aimed into exploring the compatibility of developing a digital currency that is compatible with the rulings of Islamic Law (*Shari'ah*) on currencies. To develop the understanding on what is the functions required in a currency to be compatible from an Islamic perspective. it is concluded that developing a *Shari'ah* compliant digital currency can be feasible soon since the presented cases in the research might be able to provide sufficient solutions to cover the current shortcomings of digital currencies regarding its practicality and compliance with Islamic functions of money and social objectives.

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The Role of the Skewed Distributions in the Framework of Extreme Value Theory (EVT)

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Abstract

In this paper, we analyze the role of the heavy tail and skewed distribution in market risk estimation (Value at Risk (VaR)). In particular, we are interested in knowing if in the framework of the conditional extreme value theory, the estimation of the volatility model below heavy tail and skewed distribution contributes to improve the VaR estimation respect to these obtained from a symmetric distribution. The study has been carried out for six individual assets belonging to the digital sector: ADP, Amazon, Cerner, Apple, Microsoft and Telefonica. The analysis period runs from January 1st, 2008 to the end of December 2013. Although the evidence found is a little bit weak, the results obtained seem to indicate that the heavy tail and skewed distribution outperforms the symmetric distribution both in terms of accuracy VaR estimations as in terms of firm's loss function. Furthermore, the market risk capital requirements fixed on the base of the VaR estimations are also lowest below a skewed distribution.

JEL Classifications: C15, C22, C52, G17, G32.

Keywords: extreme value theory, loss functions, skewness distributions, value at risk

1. Introduction

A context of risk is one in which we do not know with certainty the consequences associated with a decision. The only thing that we know is possible outcomes associated with it and the likelihood of achieving such results. In the financial field, the notion of risk implies that we know the various yields can potentially get to make an investment and also know the probability of achieving such results. This allows us to estimate the average expected yield and the possible diversion 'above' or 'below' the average value, that is, the risk. The most popular and traditional risk measure is volatility (variance). In fact, traditional financial theory defines risk as the dispersion of returns due to movements in financial variables.

Another way of measuring risk, which is the most commonly used at present, is to evaluate the losses that may occur when the price of the asset that makes up the portfolio goes down. This is what Value at Risk (VaR) does. The Value at Risk of a portfolio indicates the maximum amount that an investor may lose over a given time horizon and with a given probability. In this case, the concept of risk is associated with the danger of losses.

According to Jorion (2001), "VaR measure is defined as the worst expected loss over a given horizon under normal market conditions at a given level of confidence". For the estimation of VaR measure different methodologies have been developed. These methodologies can be classified in three groups: (i) parametric methods (as Riskmetrics); (ii) non-parametric method (as historical simulation) and (iii) semiparametric method (as extreme value theory, filter historical simulation and CaViar Method)[1].

Among all of them, one of the most used by the financial institution is parametric method. This method assumes

[1]See Abad, Benito and López-Martín (2014) for a review of those methodologies.

that financial returns follow a known distribution. Thus, below this method, the VaR of a portfolio at $(1-\alpha)$ confidence level is calculated as the product of the conditional standard deviation of the return portfolio by the α quantile (k_α) of the assumed distribution[2]. The mainly assumed distribution is the normal distribution. Below this assumption, k_α is the α quantile of the standard normal.

The major drawbacks of this method are related to the normal distribution assumption for financial returns. Empirical evidence shows that financial returns do not follow normal distribution. The skewness coefficient is in most cases negative and statistically significant, implying that the financial returns distribution is skewed to the left. This result is not in accord with the properties of a normal distribution, which is symmetric. In addition to this, empirical distribution of financial return has been documented to exhibit significantly excessive kurtosis (fat tails and peakness) (see Bollerslev, 1987). Consequently, the size of the actual losses is much higher than that predicted by a normal distribution.

Taking this into account, the research in the framework of parametric method has focus on investigating other density functions which capture the skew and kurtosis of financial returns. In this line, Abad, Benito, López-Martín and Sánchez (2016), Chen, Gerlach, Lin and Lee (2012), Polansky and Stoja (2010), Bali and Theodossiou (2008), Ausin and Galeano (2007), Zhang and Cheng (2005) among others, show that, in the context of parametric method, assuming fat tail and skewness distributions improve the performance of this model in VaR estimation.

As we will see later, below the conditional extreme value theory (which is one of the most successful method in estimating VaR), the value at risk of a portfolio at $(1-\alpha)\%$ confidence level is calculated as the product of the conditional standard deviation of the return portfolio by the α (k_α) quantile of Pareto generalize distribution (PGD). Traditionally, the conditional standard deviation of the return portfolio is estimated by assuming a symmetric distribution for the financial return. So, in the same line that aforementioned paragraphs in this paper, we analyze if, in the framework of the method based on the conditional extreme value theory, the estimation of the volatility model below a fat tail and skewness distribution contributes to improve the results in VaR estimation.

The rest of the paper is as follow. In section 2 we present the volatility models used in the empirical application. In section 3 we describe the VaR measure, the methodology used in this paper to calculate this measure and the backtesting techniques. The results of the empirical application are presented in section 4. Section 5 includes the main conclusion.

2. Volatility Models

According to Engle (1982), Bollerslev (1986) and Nelson (1991), the financial returns are characterized by a variance changing over time, alternating periods of low volatility followed by periods of high volatility. In other words, as noted by Mandelbrot (1963), "large changes tend to be followed by large changes, of either sign, and small changes tend to be followed by small changes". This effect, known as *volatility clustering*, indicates the presence of conditional heteroscedasticity in the return series and the need to model the behaviour of the conditional variance. Furthermore, financial returns are subject to leverage (Black, 1976). This means that volatility tends to be higher after negative returns, this is typically attributed to leverage (hence the name).

To capture cluster in volatility Engle (1982) proposed Autoregressive Conditional Heteroscedasticity (ARCH), which featured a variance that does not remain fixed but rather varies throughout a period. Bollerslev (1986) extended the ARCH model into the Generalized ARCH (GARCH). The GARCH model captures volatility clustering but does not capture the leverage effect. In this model the positive surprises have the same effect on volatility than negative surprises. To capture the leverage effect have been developed asymmetric GARCH models as for instance the APARCH model (Ding, Granger & Engle, 1993) or the EGARCH model proposed by Nelson (1991).

On the other hand, it is well known that, long memory property observed in the volatility of the financial series cannot be captured by traditional GARCH models, so it is necessary to model a long-term component. To capture this characteristic, Engle and Lee (1999) proposed a model in which the variance is decomposed into a component of long-term and short-term component. The main role of short-term component is to pick up the temporary increase in the variance after an impact on the price. While the persistence or long-term memory indicates how long the shock takes to be absorbed.

Creal, Koopman and Lucas (2008, 2011) and Harvey and Chakravarty (2008) propose a model that integrates

[2]This is true when we assume that the portfolio return mean is zero.

three characteristics aforementioned: cluster in volatility, leverage effect and long memory. The model proposed by these authors is known Beta-t-EGARCH model. In this model, the short-term component responds in the same manner as in the traditional GARCH. Nevertheless, the long-term component is not sensitive to extreme observations, as it does in the standard GARCH model. That is, in the standard GARCH, the existence of an outlier in yields has a persistent effect on volatility, which increases the variance. In contrast, the Beta-t-EGARCH model corrects volatility in case of existence of an outlier, absorbing the effect and returning to previous levels of volatility.

Formally let $r_1, r_2, \ldots, r_n$ be a sequence of independent and identically distributed random variables representing financial returns. Assume that $\{r_t\}$ follows a stochastic process:

$$r_t = exp(\lambda_{t|t-1})(\varepsilon_t), \quad \varepsilon_t \sim t(0, \sigma_\varepsilon, \nu) \qquad \nu > 2 \tag{1}$$

where the conditional error ε_t is distributed as a *t*-Student with zero mean, unconditional standard deviation σ_ε and degrees of freedom parameter ν. $\lambda_{t|t-1}$ is the conditional scale or volatility, that does not need to be equal to the conditional standard deviation. The conditional standard deviation is obtained as $\sigma_\varepsilon\ exp\ (\lambda_{t|t-1})$[3].

In the Beta-t-EGARCH model, in (1) is defined as:

$$\lambda_{t|t-1} = \delta + \lambda^{+}_{1,t|t-1} + \lambda^{+}_{2,t|t-1} \tag{2}$$

being the long-term component is $\lambda^{+}_{1,t|t-1} = \varphi_1 \lambda^{+}_{1,t-1|t-2} + k_1 u_{t-1}$ and the short-term component is $\lambda^{+}_{2,t|t-1} = \varphi_2 \lambda^{+}_{2,t-1|t-2} + k_2 u_{t-1}$. The leverage effect may be introduced into the model using the sign of the observations. Thus, the short component with leverage effect is as follow:

$$\lambda^{+}_{2,t|t-1} = \varphi_2 \lambda^{+}_{2,t-1|t-2} + k_2 u_{t-1} + k^{*}(-r_{t-1})(u_{t-1} + 1) \tag{3}$$

and u_t is the score conditional which is given by:

$$u_t = \frac{(\nu+1)(r_t)^2}{\nu exp(2\lambda_{t|t-1}) + (r_t)^2} - 1 \qquad -1 \le u_t \le \nu,\ \nu > 0 \tag{4}$$

Taking the signs of minus, r_{t-1} means that the parameter of k^* is normally non-negative for stock returns as in the GARCH model, the long-term component $\lambda^{+}_{1,t|t-1}$, has φ_1 close to one or even set equal to one, while the short-term component $\lambda^{+}_{2,t|t-1}$, will typically have a higher k combined with a lower φ. The model is not identifiable if the $\varphi_1 = \varphi_2$. Imposing the constraint $0 < \varphi_2 < \varphi_1 < 1$ ensures identifiability and stationarity.

Finally, the empirical literature has shown that financial returns also exhibit skewness and fat-tailed distributions. To capture these features, Harvey and Sucarrat (2014) extended the Beta-t-EGARCH model, combining the skewness of the conditional distribution with a leverage effect in the dynamic of the scale. This model is known as Beta-skewness-t-EGARCH.

Skewness is introduced into the Beta-t-EGARCH model using the method proposed by Fernandez and Steel (1998) (see Harvey and Sucarrat (2014) for more details of this method). Thus, in equation (1), they assume that the conditional error ε_t is distributed as a skewed t-student with mean μ_ε, scale σ_ε, degrees of freedom parameter ν and skewness parameter γ[4].

$$r_t = exp(\lambda_{t|t-1})(\varepsilon_t - \mu_\varepsilon), \varepsilon_t \sim st(\mu_\varepsilon, \sigma_\varepsilon, \nu, \gamma) \qquad \nu > 2,\ \gamma \in (0, \infty) \tag{5}$$

where $\lambda_{t|t-1}$ is given by:

$$\lambda_{t|t-1} = \delta + \lambda^{+}_{1,t|t-1} + \lambda^{+}_{2,t|t-1} \tag{6}$$

The long-term component is $\lambda^{+}_{1,t|t-1} = \varphi_1 \lambda^{+}_{1,t-1|t-2} + k_1 u_{t-1}$ and the short-term component is $\lambda^{+}_{2,t|t-1} = \varphi_2 \lambda^{+}_{1,t-1|t-2} + k_2 u_{t-1} + k^{*}(-(r_{t-1}))(u_{t-1} + 1)$. Again, only the short-term component has a leverage effect. In

[3]The specification for the standard GARCH model is as follows: $r_t = \sigma_t \varepsilon_t$, $\varepsilon_t \sim$IID $(0, \sigma^2_\varepsilon)$, where σ^2_t is the scale o volatility, which is modeled $\sigma^2_t = \delta + \varphi_1 \sigma^2_{t-1} + k_1 \varepsilon^2_{t-1}$ with $\sigma^2_\varepsilon = 1$.

[4]The conditional error ε_t is an uncentred (i.e., mean not necessarily equal to zero) Skewed t variable with ν degrees of freedom, skewness parameter γ. A centred and symmetric t-distribution variable with mean zero is obtained when $\gamma = 1$, in which $\mu_\varepsilon = 0$, whereas a left-skewed (right-skewed) t-variable is obtained when $\gamma < 1, (\gamma > 1)$. More details on the distribution can be found in Harvey and Sucarrat (2013) and Sucarrat (2013).

this model the conditional score is given by:

$$u_t = \frac{(\nu+1)(r_t+\mu_\varepsilon exp(\lambda_{t|t-1}))(r_t)}{\nu\gamma^{2(r_t+\mu_\varepsilon exp(\lambda_{t|t-1}))} exp(2\lambda_{t|t-1})+(r_t+\mu_\varepsilon exp(\lambda_{t|t-1}))^2} \quad (7)$$

3. VaR Methodology

Let $r_1, r_2, \ldots\ldots r_n$ be identically distributed independent random variables representing the financial returns. Use $F(r)$ to denote the cumulative distribution function $F(r) = Pr(r_t < r|\Omega_{t-1})$ conditioned to an information set, Ω_{t-1}, available at time *t-1*. Assume that $\{r_t\}$ follows the stochastic process:

$$r_t = \mu + \sigma_t\varepsilon_t \qquad \varepsilon_t \sim iid(0,1) \quad (8)$$

being μ the mean of returns; $\sigma_t^2 = E(\varepsilon_t^2|\Omega_{t-1})$ and ε_t has the conditional distribution function $G(\varepsilon)$, $G(\varepsilon) = Pr(\varepsilon_t < \varepsilon\,|\Omega_{t-1})$.

The VaR at a given level of confidence $1-\alpha$, denoted by $VaR\,(\alpha)$, is defined as the α quantile of the probability distribution of financial returns.

$$F(VaR(\alpha)) = Pr\big(r_t < VaR(\alpha)\big) = \alpha \quad (9)$$

There are two ways to estimate this quantile: (1) inverting the distribution function of financial returns, $F(r)$, or (2) inverting the distribution function of innovations, $G(\varepsilon)$. The latter case will also require estimating the standard deviation of returns.

$$VaR(\alpha) = F^{-1}(\alpha) = \mu + \sigma_t G^{-1}(\alpha) \quad (10)$$

Thus, the VaR estimation involves the specifications of the distribution function of financial returns, $F(r)$, or the distribution function of innovations, $G(\varepsilon)$, along with the standard deviation of returns, σ_t.

The historical simulation method, Monte Carlo simulation and unconditional approach based on the Extreme Value Theory focus on the estimation of $F(r)$, while Parametric Method and the Conditional Extreme Value Theory estimate $G(\varepsilon)$.

Below, we will describe the Conditional Extreme Value Theory, which have been used in this study to compute VaR.

3.1 Conditional Extreme Value Theory

The Extreme Value Theory (EVT) approach focuses on the limiting distribution of extreme returns observed over a long time period, which is essentially independent of the distribution of the returns themselves.

There are two methods based on EVT: a) Block Maxima Model (BMM) proposed by McNeil (1998) and b) Peaks Over Threshold Model (POT). This second model is generally considered to be the most useful for practical applications, due to the more efficient use of the data on extreme values.

Within the POT models framework, we can distinguish two types of analysis: (i) the Semi-Parametric Model built around Hill estimator and (ii) and the fully parametric models based on the generalized Pareto distribution. The latter method is commonly most used in practice.

Below, the fundamental theory of this approach is described, considering both unconditional and conditional.

Let $r_1, r_2, \ldots\ldots r_n$ be a random sequence of observations representing the financial returns. Given a threshold denoted by u, we will be interested in excess losses over the threshold[5] denoted by $y_1, y_2, y_3, \ldots y_{N_u}$, where $y_i = r_i - u$ and N_u are the number of sample data greater than u.

Then, for instance, if the threshold is equal to 1.5 %, we are left with all returns lower to 1.5 %.

The Extreme Value Theory assumes that the distribution of excess losses above the threshold follows a Generalized Pareto distribution (GPD) given for the expression:

$$G_{k,\xi}(y) = 1 - [1 + \frac{k}{\xi}y]^{-1/k} \quad (11)$$

being k y ξ the parameters of the distribution[6].

It can be shown that under this assumption, the α percentile of the distribution, as the VaR can be estimated as:

[5]The most common is to use the 10% percentile as the threshold level.

[6]These parameters can be estimated by maximum likelihood.

$$VaR(\alpha) = G_{k,\xi}^{-1}(\alpha) = u + \frac{\xi}{k}\left[\left[\frac{n}{N_u}(1-\alpha)\right]^{-\xi} - 1\right] \qquad r < u \tag{12}$$

where n represents the number of sample data.

The extreme value method described in the preceding paragraphs does not consider the level of volatility. This method is known as *Unconditional Extreme Value Theory.*

Since financial returns are variables that are characterized by heteroscedasticity, McNeil and Frey (2000) proposed a new methodology, called *Conditional Extreme Value Theory*, for estimating VaR that combines extreme value theory with models of volatility.

According to this theory, the VaR of a portfolio at a confidence level of $1-\alpha$ can be calculated as:

$$VaR(\alpha)_t = \mu + \sigma_t G_{k,\xi}^{-1}(\alpha) \tag{13}$$

where σ_t^2 represents the conditional standard deviation of the financial returns and $G_{k,\xi}^{-1}$ is the α quantile of the GPD.

To estimate the conditional standard deviation of the returns, in this paper, we use the beta-t-EGARCH model and the beta-skewness-t-EGARCH models presented in section 2.

3.2 Backtesting

To check the adequacy of the VaR estimates, we use two alternative approaches: statistical tests that evaluate the accuracy of the estimates and loss functions.

As to the first approach, to test the accuracy of the VaR estimates, we recurre some standard procedures based on statistical hypothesis testing which have been proposed in the literature. In this work, we use to test the accuracy of the VaR estimates five standard tests: (i) unconditional coverage test (Kupiec, 1995), (ii) Backtesting Criterion (BTC), (iii) conditional coverage test (Christoffersen, 1998), (iv) statistics for serial independence (LRind) and (v) dynamic quantile (Engle and Manganelli, 2004).

Before implementing these tests, we must define an exception indicator. This indicator is calculated as follows:

$$I_{t+1} = \begin{cases} 1 & si \quad r_{t+1} < VaR(\alpha) \\ 0 & si \quad r_{t+1} > VaR(\alpha) \end{cases} \tag{14}$$

Kupiec (1995) shows that if we assume that the probability of getting an exception is constant, then the number of exceptions $x = \sum I_{t+1}$ follows a binomial distribution $B(N,\alpha)$, where N represents the number of observations. An accurate measure VaR should produce an unconditional coverage $(\hat{\alpha} = \frac{\sum I_{t+1}}{N})$ equal to α percent.

Unconditional coverage test has a null hypothesis $\hat{\alpha} = \alpha$, with a likelihood ratio statistic:

$$LR_{uc} = 2[log(\hat{\alpha}^x(1-\hat{\alpha})^{N-x}) - log(\alpha(1-\alpha)^{N-x})] \tag{15}$$

which follows an asymptotic $\chi^2(1)$ distribution.

A similar test for the significance of the departure of $\hat{\alpha}$ from α is the back-testing criterion statistic (BTC):

$$Z = (N\hat{\alpha} - N\alpha)/\sqrt{N\alpha(1-\alpha)} \tag{16}$$

which follows an asymptotic N(0,1) distribution

The conditional coverage test, developed by Christoffersen (1998), jointly examines whether the percentage of exceptions is statistically equal to the one expected $(\hat{\alpha} = \alpha)$ and the serial independence of the exception indicator. The likelihood ratio statistic of this test is given by $LR_{cc} = LR_{uc} + LR_{ind}$ which is asymptotically distributed as $\chi^2(2)$ and the LR_{ind} statistic is the likelihood ratio statistic for the hypothesis of the serial independence against first-order Markov dependence[7].

[7]The LR_{ind} statistic is $LR_{ind} = 2[\log L_A - \log L_0]$ and has an asymptotic $\chi^2(1)$ distribution. The likelihood function under the alternative hypothesis is $L_A = (1-\pi_{01})^{N_{00}} \pi_{01}^{N_{01}} (1-\pi_{11})^{N_{10}} \pi_{11}^{N_{11}}$ where N_{ij} denotes the number of observations in state $_j$ after having been in state $_i$ in the previous period, $\pi_{01} = N_{01}/(N_{00}+N_{01})$ and $\pi_{11} = N_{11}/(N_{10}+N_{11})$. The likelihood function under the null hypothesis is ($\pi_{01} = \pi_{11} = \pi = (N_{11}+N_{01})/N$) is $L_0 = (1-\pi)^{N_{00}+N_{01}} \pi^{N_{01}+N_{11}}$.

Finally, the dynamic quantile test proposed by Engle and Manganelli (2004) examines if the exception indicator is uncorrelated with any variable that belongs to the information set Ω_{t-1} available when the VaR is calculated. This is a Wald test of the hypothesis that all slopes are zero in the regression model:

$$I_t = \beta_0 + \sum_{i=1}^{p} \beta_i I_{t-i} + \sum_{j=1}^{q} \mu_j X_{t-j} \quad (17)$$

where X_{t-j} are explanatory variables contained in Ω_{t-1}.

This statistic introduced as explanatory variables lags of VaR. Under null hypothesis, the exception indicator cannot be explained by the level of VaR, i.e. $VaR(\alpha)$ is usually an explanatory variable to test if the probability of an exception depends on the level of the VaR.

In a second stage, we evaluate the magnitude of the losses experienced. For this purpose, we have considered three loss functions: the regulator's loss function, the firm 's loss function and daily capital requirement.

Lopez (1998, 1999) proposed a loss function that reflects the utility function of a regulator. This function assigns a quadratic specification when the observed portfolio losses exceed the VaR estimate. Thus, we penalise only when an exception occurs according to the following specification:

$$RLF_t = \begin{cases} (VaR_t - r_t)^2 \ if \ r_t < VaR(\alpha) \\ 0 \qquad\qquad\qquad otherwise \end{cases} \quad (18)$$

This loss function gives higher scores when failures take places and considers the magnitude of these failures. In addition, the quadratic term ensures that large failures are penalised more than small failures. Among several models, that provides the lowest loss function value is the best model.

This loss function could be optimal from the perspective of the regulator, but not from the point of view of the firm since a model that generates a VaR too high leads the firm to incur high capital costs.

Taking this into account, Sarma, Thomas and Shah (2003) defines the firm's loss function as follows:

$$FLF_t = \begin{cases} (VaR_t - r_t)^2 \ if \ r_t < VaR(\alpha) \\ -\beta VaR_t \qquad\qquad otherwise \end{cases} \quad (19)$$

where β is the opportunity cost of capital.

This function penalises the cases in which there are no exceptions multiplying the VaR by a factor β. As Abad, Benito and López-Martín (2015) indicate, this product does not capture the opportunity cost of capital in an exact way. Therefore, in line with Sarma et al. (2003), they propose a new firm's loss function that is expressed as follows:

$$FABL_t = \begin{cases} (VaR_t - r_t)^2 \ if \ r_t < VaR(\alpha) \\ \beta\,(r_t - VaR_t) \quad otherwise \end{cases} \quad (20)$$

As can be determined in this function, the exceptions are penalized as usual in the literature, following the instructions of the regulator. But when there are no exceptions, the loss function penalizes the difference between the VaR and returns weighted by a factor that represents an interest rate. This product is exactly the opportunity cost of the capital, ie, the excess capital held by the firm.

Finally, we evaluate the VaR estimate on the bases of daily capital requirement (see McAleer, Jimenez & Pérez-Amaral, 2013). These authors adapt to daily term the function used by the financial institutions for calculating market risk capital requirement in a 10 days' horizon (Basel II). The daily capital requirement at time t can be calculated as follow (BCBS, 1996; 2006):

$$DCR_t = sup\{-k \times \overline{VaR}_{60}, -VaR_{t-1}\} \quad (21)$$

where DCR_t represents the daily market capital requirement at time t, which is the higher of $k \times \overline{VaR}_{60}$ and $-VaR_{t-1}$; $\overline{VaR}_{60}$ is the mean VaR over the previous 60 working days; $(3 \leq k \leq 4)$ is the Basel II violation penalty (see Table 1).

Table 1. Basel Accord Penalty Zones

Zone	Number of exceptions	k
Green	0 to 4	3
	5	3.4
	6	3.5
Yellow	7	3.65
	8	3.75
	9	3.85
Red	10 or more	4

Note: The number of exceptions is given for 250 trading days

4. Empirical Application

4.1 Data Analysis

The data set consists of daily returns of six companies from 1/04/2000 to 12/31/2013 (approximately 3520 observations). The considered companies are ADP, Amazon, Apple, Cerner, Microsoft and Telefonica. The computation of the returns (r_t) is based on the formula $r_t = ln(P_t/P_{t-1})$ where P_t is the price at time t. The evolution of daily prices and yields are represented in Figure 1.

Table 2 shows descriptive statistics of the return series. For each company, the unconditional mean is very close to zero. The highest unconditional standard deviation are 0.0368 (Amazon) and the lowest 0.0167 (ADP). For the rest series of return, the standard deviation moves between 0.0208 and 0.0275. The skewness statistic is negative for four of the series considered. This means that in most cases the distribution of those returns is skewed to the left. For all the series, the excess kurtosis statistics is above 3, implying that the distributions of those returns have much thicker tails than the normal distribution. Similarly, the Jarque-Bera statistic is significant rejecting the assumption of normality.

Table 2. Descriptive Statistics

Assets	Mean (%)	Median (%)	Maximum	Minimum	Std. Dev. (%)	Skewness	Kurtosis	Jarque Bera
ADP	0.013	0.023	0.11179	-0.26892	1.665	-1.148*	26.678*	83004
						(0.041)	(0.083)	(0.001)
Amazon	0.042	-0.004	0.29618	-0.28457	3.681	0.450*	13.170*	15289
						(0.041)	(0.083)	(0.001)
Apple	0.066	0.077	0.12239	-0.21999	2.733	-0.446*	8.041*	3844
						(0.041)	(0.083)	(0.001)
Cerner	0.066	0.063	0.22063	-0.19159	2.746	0.441*	11.995*	11981
						(0.041)	(0.083)	(0.001)
Microsoft	-0.035	0.000	0.16455	-0.18623	2.081	-0.497*	12.480*	13327
						(0.041)	(0.083)	(0.001)
Telefónica	0.029	0.000	0.20096	-0.21279	2.474	-0.011*	8.483*	4410
						(0.041)	(0.083)	(0.001)

Note: This table presents the descriptive statistics of the daily percentage returns of ADP, Amazon, Apple, Cerner, Microsoft and Telefónica. The sample period is from January 3rd 2000 to December 31th, 2013. The returns are calculated as Rt=ln(Pt/Pt-1). Standard error of the skewness an kurtosis coefficients are calculated as √(6⁄n) and √(12/n) respetively. The JB statistic is distributed as the Chi-square with two degrees of freedom; in brackets their p-value. * denotes significance at 1% level.

In Figure 1, we observe that the range of the fluctuation of the returns changes in the time and these variations evolve according to the idea of cluster in volatility (Mandelbrot, 1963). To capture this effect and others characteristics of the return as the leverage effect (Black, 1976) we use the beta-t-EGARCH model, proposed by Creal *et al*. (2008, 2011) and Harvey and Chakravarty (2008), and the beta-skewness-t-EGARCH proposed by and Harvey and Sucarrat (2013). In Table 3, we present the coefficient estimations of both models for each asset in the whole period.

All the parameters estimated are positive and statistically significant. Just in the case of Amazon k_2 is not significant. In addition, the estimations of φ_2 and φ_1 satisfy the identifiability and stationary conditions ($\varphi_2 < \varphi_1 \leq 1$). The parameter k^*, which capture the "leverage effect" is positive in all cases, indicating that volatility tends to be higher after negative returns. The value of this parameter moves between 0.015 (Microsoft) and 0.034 (Apple). To last, in the case of beta-skewness-t-EGARCH model, the parameter γ is inferior to one (γ <1) in the case of ADP, Cerner, Apple and Telefónica. This means that the distributions of those assets are skewed to the left. For the case of Amazon and Microsoft the distribution is skewed to the right (γ >1).

Table 3. Estimation of the parameters

		δ (se)	ϕ_1 (se)	ϕ_2 (se)	k_1 (se)	k_2 (se)	κ* (se)	df (se)	γ (se)	LogL (BIC)
ADP	beta-t-EGARCH(i)	0.759 (0.253)	1.000 (0.000)	0.986 (0.006)	0.012 (0.006)	0.018 (0.007)	0.024 (0,004)	5.352 (0.458)	--	-5981.5 (3.416)
	beta-skewness-t-EGARCH(ii)	0.357 (0,143)	0.988 (0.009)	0.997 (0.001)	0.024 (0.011)	0.008 (0.011)	0.022 (0.003)	5.386 (0.464)	0.953 (0.020)	-5982.1 (3.418)
Amazon	beta-t-EGARCH	1.587 (0.234)	1.000 (0.000)	0.922 (0.051)	0.022 (0.006)	0.011 (0.009)	0.024 (0.007)	4.179 (0.269)	--	-8522.3 (4.860)
	beta-skewness-t-EGARCH	1.592 (0.236)	1.000 (0.000)	0.899 (0.052)	0.023 (0.005)	0.010 (0.009)	0.023 (0.007)	4.202 (0.270)	1.065 (0.023)	-8518.17 (4.860)
Apple	beta-t-EGARCH	1.435 (0,197)	1.000 (0.000)	0.882 (0.033)	0.015 (0.004)	0.025 (0.008)	0.034 (0.006)	6.136 (0.567)	--	-8013.3 (4.571)
	beta-skewness-t-EGARCH	1.432 (0.196)	1.000 (0.000)	0.885 (0.032)	0.015 (0.004)	0.026 (0.008)	0.034 (0.006)	6.115 (0.0566)	0.978 (0.022)	-8012.9 (4.573)
Cerner	beta-t-EGARCH	1.462 (0.221)	1.000 (0.000)	0.964 (0.012)	0.014 (0.004)	0.027 (0.008)	0.023 (0.004)	4.742 (0.354)	-	-7700.91 (4.393)
	beta-skewness-t-EGARCH	1.465 (0.221)	1.000 (0.000)	0.964 (0.012)	0.014 (0.004)	0.027 (0.008)	0.024 (0.005)	4.726 (0.354)	0.989 (0.021)	-7700.8 (4.395)
Microsoft	beta-t-EGARCH	0.826 (0.304)	1.000 (0.001)	0.971 (0.013)	0.019 (0.005)	0.030 (0.008)	0.015 (0.004)	4.780 (0.350)	--	-6675.8 (3.810)
	beta-skewness-t-EGARCH	0.319 (0.121)	0.943 (0.023)	0.996 (0.002)	0.032 (0.008)	0.020 (0.006)	0.015 (0.004)	4.830 (0.356)	1.004 (0.022)	-6672.8 (3.811)
Telefónica	beta-t-EGARCH	1.185 (0.192)	1.000 (0.000)	0.972 (0.008)	0.007 (0.003)	0.036 (0.006)	0.020 (0.004)	8.034 (0.927)	--	-7716.9 (4.402)
	beta-skewness-t-EGARCH	1.193 (0.191)	1.000 (0.000)	0.973 (0.008)	0.007 (0.003)	0.037 (0.006)	0.021 (0.004)	8.084 (0.945)	0.973 (0.022)	-7716.2 (4.404)

Note: The table reports the parameters estimates of the beta-t-EGARCH model (equation (2)) and beta-skewness-t-EGARCH model (equation (6)). (se) denotes the standard deviation (in parentheses). Log-L is the maximum likelihood value and BIC is the Bayesian Information Criterion. κ* is the parameter that capture the "leverage effect". γ is the parameter that capture skewness in distribution. γ <1, (γ >1) denote skewed to the left (right).

(i) beta-t-EGARCH model

$$r_t = exp(\lambda_{t|t-1})(\varepsilon_t), \quad \varepsilon_t \sim t(0,\sigma_\varepsilon,\nu) \qquad \nu > 2$$

$$\lambda_{t|t-1} = \delta + \lambda^+_{1,t|t-1} + \lambda^+_{2,t|t-1}$$

$$\lambda^+_{1,t|t-1} = \varphi_1 \lambda^+_{1,t-1|t-2} + k_1 u_{t-1}$$

$$\lambda^+_{2,t|t-1} = \varphi_2 \lambda^+_{2,t-1|t-2} + k_2 u_{t-1} + k^*(-r_{t-1})(u_{t-1}+1)$$

(ii) beta-skewed-t-EGARCH model

$$r_t = exp(\lambda_{t|t-1})(\varepsilon_t - \mu_\varepsilon), \quad \varepsilon_t \sim st(\mu_\varepsilon,\sigma_\varepsilon,\nu,\gamma) \qquad \nu > 2,\ \gamma\ \epsilon(0,\infty)$$

$$\lambda_{t|t-1} = \delta + \lambda^+_{1,t|t-1} + \lambda^+_{2,t|t-1}$$

$$\lambda^+_{1,t|t-1} = \varphi_1 \lambda^+_{1,t-1|t-2} + k_1 u_{t-1}$$

$$\lambda^+_{2,t|t-1} = \varphi_2 \lambda^+_{1,t-1|t-2} + k_2 u_{t-1} + k^*(-(r_{t-1}))(u_{t-1}+1)$$

4.2 VaR Applications

In this section, the beta-t-EGARCH model and the beta-skewness-t-EGARCH model presented in section (2) are used to calculate the VaR one day ahead at 1% probability. The obtained estimations are compared. The analysis period, marked in dark in Figure 1, ran from January 1st, 2008, to December 31th, 2013 (N=1511).

The comparison of the VaR estimates has been conducted in terms of evaluating the accuracy of the VaR estimates and of the loss function. In Figure 2, we present the returns and the VaR estimates obtained from both volatility models and for all assets considered. As we can observe, the risk assumed by the companies varies along the sample being especially high in 2008-2009. The naked eye, it seems that there are no significant differences between the VaR estimation from both models

To evaluate the accuracy of the VaR estimates, several standard tests are used. The results of these tests are presented in Table 4. For each index, it is presented the number and the percentage of exceptions obtained with each volatility model considered. The percentages of exceptions are marked in bold. Below the percentages, the statistics used to test the accuracy of the VaR estimates are presented. These statistics are as follows: (i) the unconditional coverage test (LRuc); (ii) backtesting criterion (BTC), (iii) statistics for serial independence (LRind); (iv) the conditional coverage test (LRcc) and (v) the Dynamic Quantile test (DQ). When the null hypothesis that "the VaR estimate is accurate" has not been rejected by any test, we shaded the region of the figure that represents the number and percentage of the exceptions.

The percentage of exceptions goes below 1% in almost all cases indicating that both models overestimate risk. Just in the case of apple the risk is underestimated. However, it is worth to note that the number and the percentage of the exceptions are close to the expected one. The accuracy tests used to test formally the performance of the volatility models in terms of VaR corroborate this hypothesis. These results indicate that both models provide accurate VaR estimates in all cases.

Table 4. Accuracy test

	Beta-t-EGARCH	Beta- skewness-t-EGARCH	Beta-t-EGARCH	Beta- skewness-t-EGARCH
	ADP		**Cerner**	
Nº exceptions	11	11	12	12
% exceptions	**0.73**	**0.73**	**0.79**	**0.79**
LR uc	0.46	0.46	0.58	0.58
BTC	0.23	0.23	0.29	0.29
LR ind	0.79	0.79	0.77	0.77
LR cc	0.74	0.74	0.82	0.82
DQ	0.98	0.08	0.14	0.14
	Amazon		**Microsoft**	
Nº exceptions	10	10	12	12
% exceptions	**0.66**	**0.66**	**0.79**	**0.79**
LR uc	0.35	0.35	0.58	0.58
BTC	0.17	0.17	0.29	0.29
LR ind	0.81	0.81	0.77	0.77
LR cc	0.63	0.63	0.82	0.82
DQ	0.99	0.98	1	1
	Apple		**Telefónica**	
Nº exceptions	18	16	14	17
% exceptions	**1.19**	**1.06**	**0.93**	**1.13**
LR uc	0.63	0.88	0.85	0.75
BTC	0.3	0.39	0.38	0.35
LR ind	0.66	0.7	0.74	0.68
LR cc	0.81	0.92	0.93	0.87
DQ	0.53	0.98	0.84	0.89

Note: VaR violation ratios of the daily returns (%) are boldfaced. The table reports the p-values of the following tests: (i) the unconditional coverage test (LRuc); (ii) the backtesting criterion (BTC); (iii) statistics for serial independence (LRind), (iv) the conditional coverage test (LRcc) and (v) Dynamic Quantile test (DQ). A p-value greater than 5% indicates that the forecasting ability of the VaR model is accurate. The shaded cells indicate that the null hypothesis that the VaR estimate is accurate is not rejected by any test.

Additionally, with the aim of detecting differences between both models (beta-t-EGARCH and beta-skewness-t-EGARCH) we follow Gerlach ,Chen and Chan (2011) and focus on analyzing the ratio VRate/α and some statistics of it. This ratio is calculated as the quotient of percentage exception by the value of α, which is 1%. The beta-t-EGARCH model provides a VRate/α more close to one for three assets (ADP, Cerner and Telefónica) the same the beta-skewness-t-EGARCH (ADP, Cerner and Apple) (Table 5). Table 6 displays summary statistics for VRate/α for each model across the 6 assets. The Std(1) column shows the standard deviation from expected ratio of 1 (not mean sample), while 1st column counts the assets where the model ranked had VRate/α closest to 1.

Table 5. Ratio Vrate/alfa at alfa=1% for each VaR model

	ADP	**Amazon**	**Apple**	**Cerner**	**Microsoft**	**Telefónica**
Beta-t-EGARCH	0.73	0.66	1.19	0.79	0.79	0.93
Beta-skewness-t-EGARCH	0.73	0.66	1.06	0.79	0.79	1.13

Note: Shaded cells indicate closest to 1 in that index.

Table 6. Summary statistics for the ratio Vrate/alfa at alfa=1%

	Mean	Median	Std(1)	1st
Beta-t-EGARCH	0.82	0.79	0.25	3
Beta-skewness-t-EGARCH	0.84	0.79	0.23	3

Note: Shaded cells indicate the most favoured in each column. Std (1) is the standard deviation in ratios from an expected value of 1. 1st indicates the number of markets where that model's VRate/α ratio ranked closest to 1.

According to these statistics the beta-skeweness-t-EGARCH model provides the better results as the mean of the ratio is closer to one and the std(1) is lower than those provide by the beta-t-EGARCH model.

Thus, although the evidence is weak the results indicate that in terms of accurate the beta-skewness-t- EGARCH model may outperform the beta-t-EGARCH which have been estimate below a symmetric distribution.

Another way to compare the VaR estimates that is often used in the VaR literature is through a loss function. The loss function measures the magnitude of the losses experienced. A model that minimises the total loss is preferred to other models. For this purpose, we have considered two loss functions: the regulator's loss function proposed by Lopez (1998, 1999) and the firm's loss function (ABL loss function) (Abad et al., 2015). The results of these loss functions are presented in tables 7[8].

Table 7. Loss functions

Panel (a): Lopez Loss Function (%)						
	ADP	Amazon	Apple	Cerner	Microsoft	Telefónica
Beta-t-EGARCH	0.0721	0.5856	3.1905	0.8017	1.3473	0.7175
Beta-skewness-t-EGARCH	0.0793	0.6757	3.1416	0.8002	1.2492	0.7367
Panel (b): ABL Loss Function (%)						
	ADP	Amazon	Apple	Cerner	Microsoft	Telefónica
Beta-t-EGARCH	0.0708	0.1312	0.10218	0.09079	0.09398	0.10219
Beta-skewness-t-EGARCH	0.07066	0.1301	0.102	0.09037	0.0938	0.09838

Note: The table reports the values of the different loss functions of each VaR model at 99% confidence levels. In both cases, the table shows the average of the losses. The shaded cells denote the minimum value for the different loss functions.

According to the regulator´s loss function there is no model superior to other. The beta-t-EGARCH model provides the lowest losses for ADP, Amazon and Telefónica while the beta-skewness-t-EGARCH model provides the lowest losses for Apple, Cerner and Microsoft. Thus, from the point of view of the regulator both models seem to be equivalent. However, according to the firm´s loss function, which takes the opportunity cost of capital into account, the beta-skewness-t-EGARCH model outperform the beta-t-EGARCH model by providing the lowest losses for all assets considered. Although in daily terms these differences are reduce in annual and monetary terms become high. For instance, for a portfolio value of 10 million of dollars the differences in annual capital opportunity cost provide for both models move around 3500 dollars (ADP) and 92250 dollars (Telefónica). Moreover, for a portfolio value of 100 millions of dollars these differences move around 350000 and 952500 dollars[9]. These data reflect that, although the differences in daily capital opportunity cost are small, in annual and monetary terms become high.

To last, we compare VaR estimates in terms of daily capital requirement (DCR) which have been calculated according to equation (21). The average of the DCR moves around 10% and 20% depending of the asset (Table 8). For almost all assets considered the Beta-t-skewness-EGARCH model provide the lowest daily capital requirement. The difference between these models moves around 0.01%-0.24% depending on the asset.

Table 8. Daily Requirement Capital

	ADP	Amazon	Apple	Cerner	Microsoft	Telefónica
Beta-t-EGARCH	11.70%	20.98%	16.78%	15.92%	15.10%	16.69%
Beta-skewness-t-EGARCH	11.82%	20.72%	16.57%	15.88%	15.11%	16.36%

Note: The table reports the average daily capital requirement (DCR) obtained according to equation 21. For each asset the shaded cells denote the model that provide the lowest average of the DCR

[8]In order to calculate the firm's loss function, we proxy the cost of capital with the interest rate of the Eurosystem monetary policy operations of the European Central Bank.

[9]The annual capital opportunity cost is calculated by multiplying the average of the daily opportunity cost by 250 days. And the average of the daily opportunity cost is calculated as the date included en Table 7 (panel(b)) divide by 100 times the portfolio value.

As a resume we can conclude that, in the framework of the conditional extreme value theory considering, a skewness t-Student distributions for the returns does not contribute to improve the accuracy VaR estimations respect to the symmetric t-Student distribution. However, the results obtained by the loss function indicate that this kind of distributions may be preferred by the financial companies, as they provide opportunity capital cost lowest. In addition, for the banks, using a skewness t-Student distribution take them to keep market risk capital requirement lowest.

5. Conclusion

It is well documented in the literature that the financial return distribution is characterized for being skewed and exhibit an important excess of kurtosis. So that to assume a normal distribution for VaR estimation may take us to underestimate risk.

Taking this into account, the research in the framework of parametric method for VaR estimation has focus in investigating other density functions that capture the skew and kurtosis of financial returns. In this line, recently papers show that in the context of this method assuming a fat tail and skewness distributions improve the results.

In this same line, we evaluate the role of the heavy tail and skewed distribution in VaR estimation in the framework of the conditional extreme value theory. Below the conditional extreme value theory, the value at risk of a portfolio at $(1-\alpha)\%$ confidence level is calculated as the product of the conditional standard deviation of the return portfolio by the α (k_α) quantile of Pareto generalize distribution. Traditionally, the conditional standard deviation of the return portfolio is estimated by assuming a symmetric distribution for the financial return, normal or student-t distribution. Thus in this paper we analyze if in the framework of this method the estimation of the volatility model below a fat tail and skewness distribution contribute to improve the results in VaR estimation.

The study has been done for six individual assets bellowing to the telecommunication sector: ADP, Amazon, Cerner, Apple, Microsoft and Telefónica. The analysis period runs from January 1st 2008 to the end of December 2013. Although the evidence found is a little bit weak the results obtained seems to indicate that the heavy tail and skewed distribution outperform the symmetric distribution both in terms of accuracy VaR estimations as in terms of firm's loss function and requirement capital.

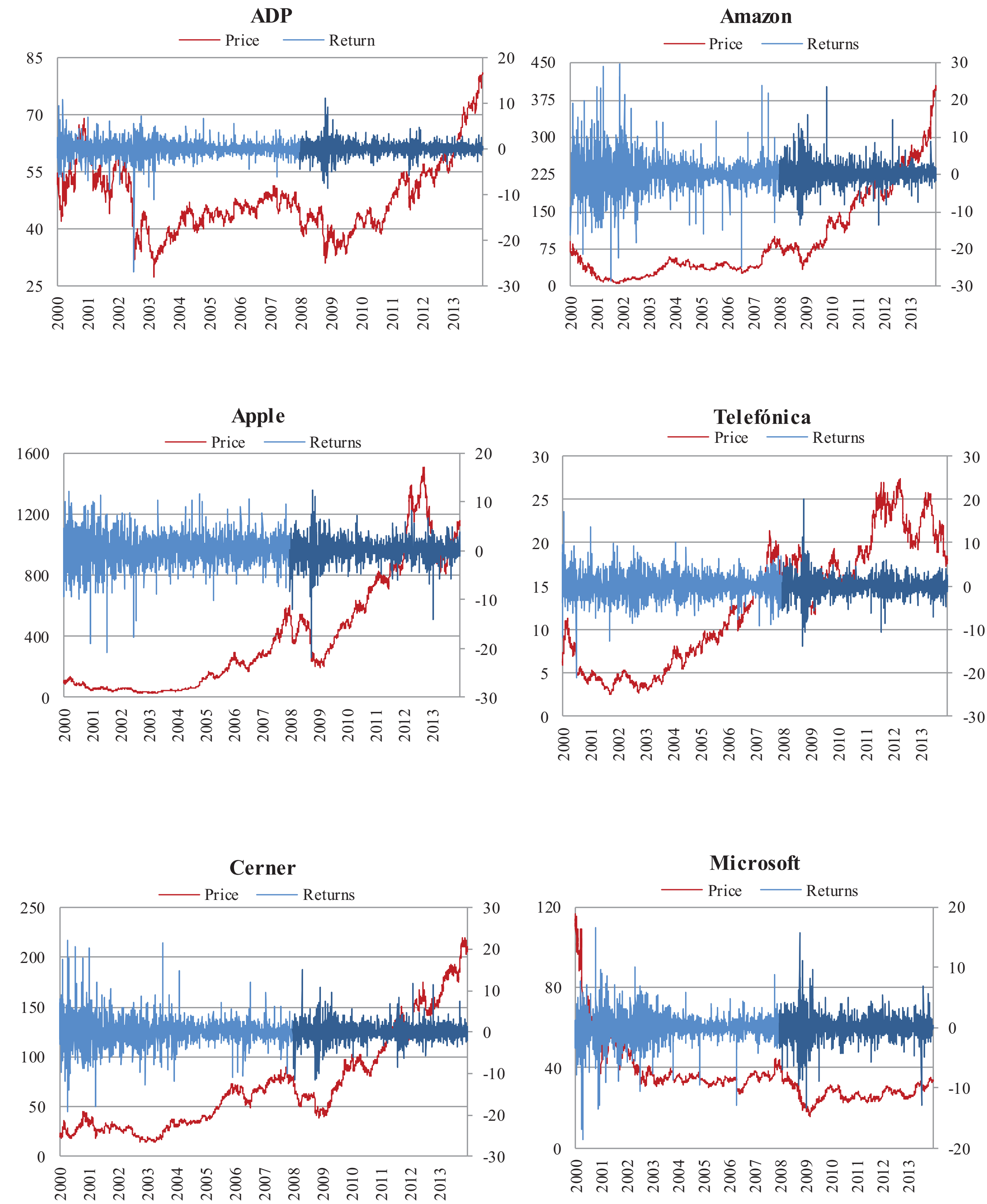

Figure 1. Evolution of daily prices and yields

Note: This figure illustrates the daily evolution of price (red) and returns (blue) of six assets (ADP, Amazon, Apple, Cerner, Microsoft and Telefónica) from January 3rd 2000 to December 31th, 2013.

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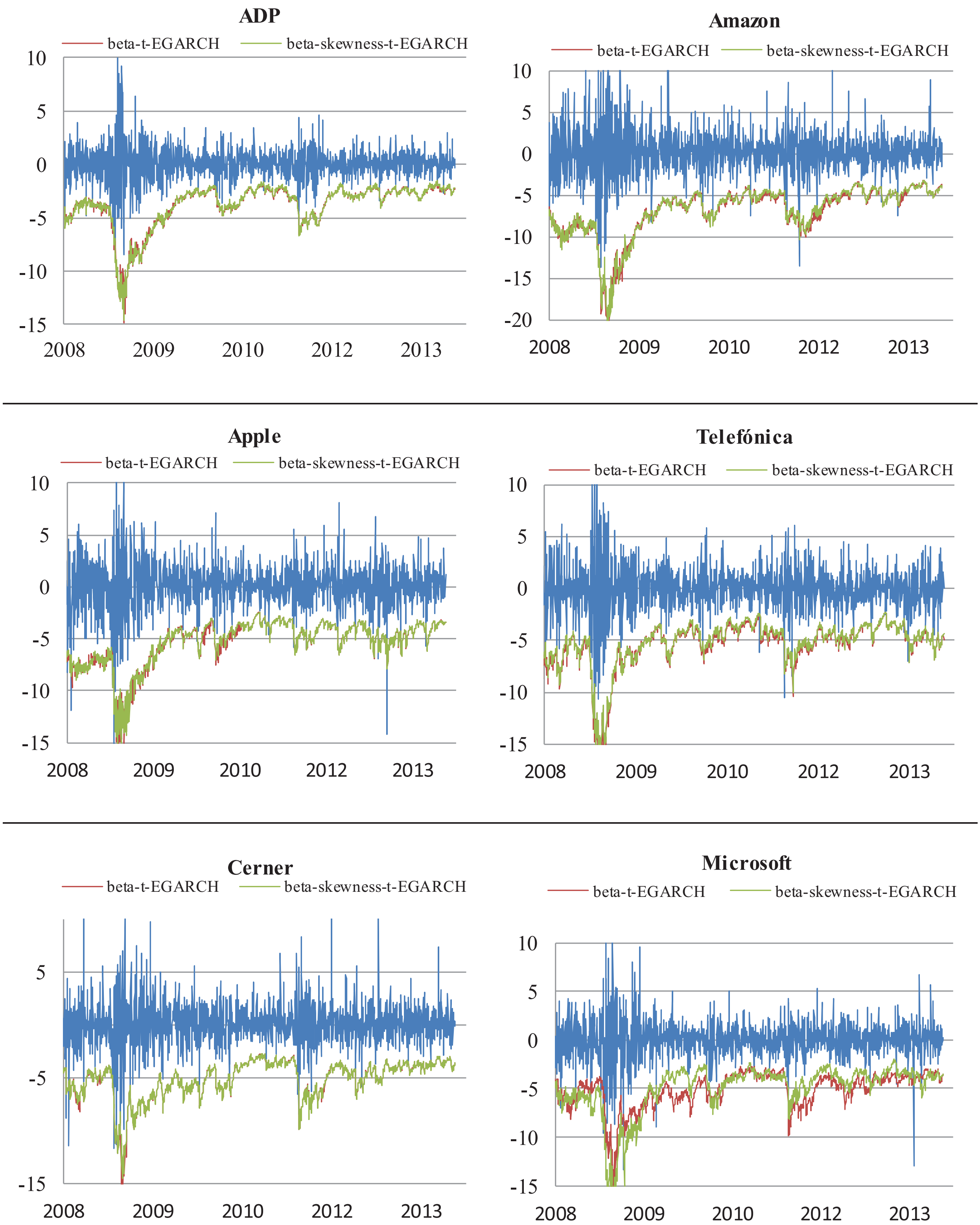

Figure 2. Returns and VaR estimations

Note: This figure illustrates the return (blue) and VaR estimations obtained from the beta-t-EGARCH model and the beta skewness-t- EGARCH model. The analysis period goes from January 1rd 2008 to December 31th, 2013.

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Understanding the Nature and Process of Alternative Dispute Resolution and Collective Conciliation: Lessons from United Kingdom, Canada, South Africa and Japan

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Abstract

This paper presents a systematic investigation into previous studies, conducted among scholars on the nature and process of Alternative Dispute Resolution and collective conciliation in some selected countries. It presents an assessment of previously conducted empirical studies on the factors that shape the nature and process of ADR and collective conciliation. It examines how these factors influence the attitude and opinion of the users of the service and impact on outcomes in practice. The findings of the study illustrate the significance of the state and its machinery in the establishment and funding of ADR institutions. It demonstrate the importance of trade unions and management representatives acknowledging their inability to resolve their dispute and the extent which their request for conciliation indicate their level of trust and confidence in the process as evident in South Africa, the United Kingdom, Canada and Japan. In addition, the findings establish how the behaviour of the state, as reflected through its approach to the employment relationship influences the actions and perception of trade unions and management representatives. The study recommends that in order to further increase the trust and confidence of trade unions and management on the outcomes of dispute resolution, the neutrality and confidentiality of the process of conciliation is essential. The role and style of conciliators during resolution is also important because; it has the tendency to influence the assessment of trade unions and management representatives during negotiation and impact on their attitude to the process and outcomes of conciliation in practice.

Keywords: alternative dispute resolution, nature and process of collective conciliation, South Africa, the United Kingdom, Canada, Japan, outcomes

1. Introduction

Academic debates on Alternative Dispute Resolution (ADR) and collective conciliation tend to focus on a number of key aspects of conciliation including the contextual and institutional framework that surrounds it (Hawes, 2000; Goodman, 2000) and the personality and role or styles and strategies of conciliators (Dix *et al*., 2008; Dix and Oxenbridge, 2004). Other studies have reported how the outcomes of conciliation are dependent on the willingness of the parties to engage in negotiation and make compromise (Bond, 2011; Ruhemann, 2010; Dickens, 2000). More recent studies have focused on the attitude of the parties towards each other, the level of their tolerance of the involvement of an independent third party, and how the action of the parties determines the process and outcomes of conciliation (Broughton and Cox, 2012; Heery and Nash, 2011). None of these studies have presented empirical analysis on the nature and process of collective conciliation hence; this article presents a review of empirical studies on ADR and collective conciliation in some selected context. The assessment is undertaken in order to identify the specific factors (through empirical studies) that are involved in the process and outcomes of ADR and collective conciliation. This paper is divided into five sections and structured as follows: Section two presents the meaning, nature and practice of ADR and collective conciliation in different contexts. Section three then examines the emergence and nature of ADR and collective conciliation in South Africa, the United Kingdom, Canada and Japan. The analysis in this section is grouped into three sub-sections. Firstly, the environmental and institutional factors that shape the nature of collective conciliation is considered; Secondly, the legislative factors that shape the nature and process of collective conciliation are examined; and the third sub-section investigates the emergence and nature of ADR and collective conciliation. Section four present explanations on the attitudes and perceptions of the users of collective conciliation, considers the discussion of findings and conclude.

2. Meaning, Nature and Practice of ADR and Collective Conciliation in Different Contexts

A critical review of existing literature reveals that conciliation and arbitration have been available to employers and their trade unions in the United Kingdom (UK) since the 1800s, although these processes were in minimal use until the 1970s. Industrial courts and tribunal systems and industrial action were the preferred methods for resolving workplace-related disputes (Van Gramberg *et al.,* 2016; Saundry *et al.,* 2016; Hann *et al.,* 2016; Teague and Roche, 2012; Baker, 2002; Mistelis, 2001; Gould, 1998). The establishment of the Advisory, Conciliation and Arbitration Service (ACAS) in the UK was a key moment in 1975. ACAS was instituted as a publicly-funded independent organisation that performs a wide selection of functions ranging from handling complaints and giving advice to the providing of conciliation and mediation and arbitration services in both the public and private sectors. This non-statutory system of ADR, carried out by ACAS in the UK is not influenced by government policies however; its structure and organisation may be modified or changed by state regulations (Dix and Oxenbridge, 2004; Hawes, 2000; Goodman, 2000). The UK system of conciliation and arbitration shares some features with Canada and Japan. In the 1970s, non-adversarial methods of resolving disputes had been successfully incorporated into the civil procedure system made available for collective dispute resolution in these countries (Forsyth and Smart, 2009; Funken, 2003). The state plays a key role in the formulation of legislation that frames the employment relationship through its contractual dimension and specifically, concerning the recognition and integration of ADR as an alternative method for resolving workplace disputes (Forsyth and Smart, 2009; Funken, 2003).

ADR does vary in nature, however, in different contexts. Pretorius (1993) describes the rise of ADR institutions in South Africa. According to Pretorius's (1993) study, the legal institutions of South Africa's apartheid government were viewed with a great deal of suspicion by the majority of the population, who had become frustrated and discouraged with the system of court proceedings because a power tussle had become the underlying factor influencing the activities of the parties. ADR processes and their institutions were developed in South Africa in the 1980s. The state has since played a key role, as revealed in its attitude towards trade union and management related issues through the restructuring of the labour laws that make it possible for trade unions to engage with management in collective bargaining and alternative dispute resolution. The situation in South Africa demonstrates how contextual factors within the society translate to the workplace. It indicates how workplace related disputes between trade union and management are perceived and the way in which their perception impacts on the end results of resolution (Nupen, 2014; Bhorat *et al.,* 2009).

In Canada, conciliation and mediation are the primary dispute resolution processes available for the resolution of collective disputes. According to the Federal Mediation and Conciliation Service (FMCS) in Canada, conciliation is conducted by conciliation officers or by a conciliation board appointed by the Minister for Labour. Apart from the conciliation and mediation services provided by the FMCS, private mediation services are widespread in Canada because it is a required step for the parties to take before approaching the court for settlement. Meanwhile in Japan, three methods of ADR are commonplace: conciliation, compromise (a combination of litigation and mediation) and arbitration (Funken, 2003). The importance of the neutrality of ADR institutions while carrying out their responsibilities and the ability of the state to provide financial assistance makes it easy for these ADR institutions to effectively provide voluntary and confidential as well as free services. The key point to note from Canada and Japan's ADR method is that conciliation is in operation and the state is responsible for providing the financial assistance needed by the ADR institutions to maintain their neutrality and provide confidential service to trade unions and management.

3. Emergence and Nature of ADR and Collective Conciliation

A range of studies have examined the factors that shape the nature and process of collective conciliation. Goodman's (2000) analysis examined the causes of disputes that are essential while shaping the nature and process of collective conciliation. Goodman's (2000) study in the UK identified the causes as: conflict over the terms and conditions of employment, trade union recognition, redundancy, dismissal and discipline, and changes in working practices. Other empirical studies in the UK (see Hale *et al.,* 2012; Heery and Nash, 2011) have examined the sources of requests for collective conciliation, and the findings reveal both employers and trade unions requests for conciliation, although a joint request for conciliation is becoming common. The findings from studies by Hale *et al.* (2012) and Heery and Nash (2011), also in the UK, put forward the idea that there is a rise in the level of awareness and acceptance of collective conciliation in the workplace. Thus, indicating conciliation may in some circumstances provide the platform needed by employers and trade unions to resolve their differences of opinion and continue with negotiations without resorting to litigation (Hale *et al.,* 2012; Heery and Nash, 2011; Goodman, 2000).

The role of conciliators has formed the focus of a significant portion of studies of collective conciliation. Some see the role of conciliators as enabling a voluntary settlement between the disputing parties (Hernández *et al.,* 2016; Poole, 2016; Dix, 2000; Lewis, 1982). Others maintain that conciliators carry out their role by acting as intermediaries in the exchange of information and ideas and ensuring that the parties maintain open communications with each other by clarifying issues and establishing mutual grounds for settlement (Clark *et al.,* 2012; Dix and Oxenbridge, 2004; Dix, 2000). Still others find that conciliators are involved in identifying likely barriers to progress by dispelling parties' unrealistic expectations. Furthermore, these studies maintain that conciliators consider with the parties the shortcomings of unresolved disputes, and create reassurance that an acceptable solution will be found (Poole, 2016; Cooper *et al.,* 2016; Goodman, 2000; Kessler, 1980; Goodman and Krislov, 1974).

Many studies (see Dix and Oxenbridge, 2004; Dix, 2000) have described the role of conciliators as providing a calm and informal atmosphere and understanding the difficulties that the parties are faced with and having a knowledge and experience of industrial relations. Conciliators may be able to offer suggestions to the parties about possible solutions by using their experience in a variety of ways specifically to build the confidence of the parties in the process and outcomes of conciliation (Hiltrop, 1985; ACAS Annual Report 2013/14; Dickens, 1979). These roles of conciliators have been grouped into three categories: reflexive, informative and substantive (Dix, 2000). Reflexive roles are concerned with responding to the needs of the parties and establishing a positive working relationship, while at the same time giving the conciliator a better insight and understanding of the case (Kressel and Pruitt, 1989; 1985). As information providers, conciliators are required to clarify the details of the case and to convey factual information to the parties. While acting in this capacity, conciliators are required to address discrepancies in the knowledge of the parties and ensure that both sides are equally aware and informed of the legislative dimensions of their case. Conciliators' substantive involvement allows them to move the parties towards resolving their dispute by exploring the strengths and weaknesses of the case. This substantive influence of the conciliator is a common feature of conciliation that allows the conciliator to assess where parties interest lie and to consider what is achievable within the limit of the law to promote settlement (Pruitt and Carnevale, 1993; Hiltrop, 1985).

Following on from the explanations on the categorisation of the roles of conciliators, Dix (2000) maintains that the style of conciliators (reactive-proactive, message bearer-influences, passive- forceful) can have a significant impact on the process and results of conciliation. Conciliators ability to initiate a connection with the parties tends to shape the opinion of the parties about the process of conciliation and have an impact on their view about the approach of the conciliator and the results of conciliation. The conciliators style – message bearing and seeking to influence– relates to the intention of conciliation to provide an open platform for effective communication. This description highlights the duties of the parties and explains the responsibilities of the conciliator during negotiations. Although some conciliators discuss the details of the case and make an effort to influence the decisions of the parties while bearing messages from one party to the other, others simply convey the required information without engaging with the parties. The behaviour of the conciliator during this process can be said to be a reflection of the personality and technique that the conciliator decides to apply at the different stages of the dispute. It suggests the importance of the way in which conciliators present the arguments of each party and how they (the conciliators) strive to gain the confidence of the parties while seeking to influence the effects of negotiations (Dix, 2000).

These different conciliation roles do, it seems, have an impact on the process and outcomes. Conciliators may decide to act their roles out concurrently to fulfill a variety of purposes, particularly as a case progress. The most satisfied service users tend to be those who have experienced more proactive styles of conciliators (Hale, *et al.,* 2012; Dix *et al.,* 2008; ACAS and Ipsos Mori 2006; Dix 2000), which help the parties to rethink their positions on the dispute. In addition to the role of the conciliators, other factors that have a significant impact on the nature and process of end results of conciliation include: the years of experience of the conciliator, the nature of the involvement of the conciliator and training, level of involvement or participation of the conciliator in the practical settlement of the dispute (Gibbons, 2007; Dix and Oxenbridge, 2004; Molloy *et al.,* 2003).

4. Attitudes and Perceptions of Users of Collective Conciliation

Several studies have argued that the approach and opinion of the parties about the conciliator and the process of conciliation tend to influence the outcomes of resolutions. For instance, Molloy *et al.,* (2003) claim that conciliation is mostly used by parties in a dispute when they feel that they cannot move forward without assistance

(Heery and Nash, 2011; Dawe and Neathey, 2008; Dix and Oxenbridge, 2004). Others maintain that parties opt for conciliation when they fail to agree or when negotiations have broken down and internal dispute machineries have been exhausted (ACAS, 2014; ACAS and Ipsos Mori, 2006; Goodman, 2000). Some studies assert that the use of conciliation is informed by the desire of the parties to obtain independent and unbiased assistance (Dix et al., 2008; Molloy *et al.,* 2003; Dix, 2000), while others affirm that the choice of conciliation is mainly due to its being the next step in the dispute procedure, or because the settlement process requires the parties to conciliate before they can proceed to arbitration (ACAS, 2014; Heery and Nash, 2011; ACAS and Ipsos Mori, 2006).

The central point to take note of is the importance of the parties acknowledging their inability to resolve the dispute and their request for third party assistance. Where collective conciliation is not used, this may be attributed to the view that the disputes have not reached a total impasse (Dawe and Neathey, 2008; Molloy *et al.,* 2003). Others affirm that disputing parties do not see what solution conciliators could find that they cannot possibly find themselves (ACAS, 2014; Bond, 2011; ACAS and Ipsos Mori, 2006). Studies assert that disputing parties are of the opinion that it is their job to sort out disputes without bringing in outsiders, hence signifying the parties' perception about the amount of control that conciliators might have over the case and the fact that what might sound reasonable during conciliation might seem very different outside to their members.

The attitude of the parties towards the conciliator and the conciliation process is a crucial factor here. For instance, the use of conciliation could be perceived by some trade unions and management as a sense of personal failure. Others could view the conciliator as an outsider who does not have as much in-depth knowledge about the industry and the peculiarities that exist within the workplace such as the union-management relationship. This description informs the attitude of some trade unions and management representatives who conclude that the role of the conciliator is not important during conciliation (Bond, 2011; Ruhemann, 2010). According to this viewpoint, since the role of the conciliator is limited to facilitating and not making a judgment on the case like arbitrators or judges, then the parties may as well sit back in the comfort of their workplace and proffer solutions to their dispute; especially since the outcome of conciliation needs to be implemented by employers and trade unions and not by the conciliator. This standpoint indicates that the involvement of conciliators in a collective employment dispute tends to undermine the traditional oppositional dynamics of industrial relations (Bond, 2011; Ruhemann, 2010).

The non-use or low use of collective conciliation can be attributed to fear and anxiety. According to studies by Broughton & Cox (2012) and Heery and Nash (2011), some employers are of the opinion that by involving conciliators in a collective employment dispute it would result in loss of their control of the settlement process and its possible outcome. This demonstrates the importance of adequate information and education of trade unions and management representatives, as well as other stakeholders that have a role to play in collective conciliation. Training and communication tend to eliminate anxieties and worries by providing opportunities for inquiries to be made about the process and expectations at the end of conciliation. They also provide knowledge of the importance of legislation and the impact of this on negotiations and end results. Additionally, training and communication allow the parties to ask questions and make clarifications which will erase misinterpretation and shape their perception as actors and determine the results of collective conciliation (Broughton and Cox, 2012; Heery and Nash, 2011).

Studies do confirm the importance of the conciliator alongside a host of other institutional and contextual factors in shaping the process and outcomes. For example, an empirical investigation by ACAS and Ipsos Mori (2006) into the settlement rate and satisfaction of disputing parties revealed that 44% of respondents confirm that conciliators' involvement facilitated the rapid resolution of their case or helped them to move closer towards resolving their dispute. Others reveal that customer satisfaction is particularly high in disputes where most of the key issues were resolved or when some progress was made towards resolution (Booth, *et al.,* 2016; Hale, *et al.,* 2012; Dawe and Neathey, 2008; Hiltrop, 1985). Advocates of this view specify that conciliators who proactively seek agreement with disputing parties record a high rate of satisfaction (Hale, *et al.,* 2012; Dawe and Neathey, 2008). Others establish that the conciliator's ability to identify areas of agreement and disagreement while exploring the parties' points of view on the dispute is also usually associated with a high satisfaction rate. More recent studies that examined the impact of collective conciliation on outcome of disputes and timing of assessment reveal that conciliation has assisted in bringing the parties closer together and has also helped them to avoid industrial action and speed up resolution (Hale, *et al.,* 2012; Heery and Nash, 2011; Bond, 2011; Ruhemann, 2010; Dawe and Neathey, 2008). Still others assert that conciliation has impacted positively on the relationship that exists between the parties and improved the result of the resolution. Studies that considered the impact of conciliators' non-intervention in dispute situations confirm that the case would have resulted in the dispute remaining unresolved or being steered towards industrial action or a strike (Hale *et al.,* 2012; Dawe and Neathey, 2008). The important idea to consider is that irrespective of the approach or style that the conciliator decides to adopt during conciliation the principal aim of building a relationship and exploring the parties' points of view on the dispute, then providing a rapid resolution to improve the results is essential for high customer satisfaction rate (Heery and Nash, 2011; Bond, 2011; Ruhemann, 2010).

Effective communication is an important tool for conciliators because at the end of conciliation it is anticipated that the parties understand each other's position and the legislation, and can identify the strengths and weaknesses of their case with a view to making a compromise when necessary for the dispute to be resolved (Meadows, 2007; Molloy *et al.,* 2003). Parties seek the assistance of conciliators when they are apprehensive about the future; as soon as the parties decide to approach conciliation they need to understand the need to de-emphasize the power relationship key features of Collective bargaining and Negotiation (CB and N). This is because during conciliation the parties are responsible for proposing solutions that will sustain their relationship. Previous studies assert that instead of the parties maintaining entrenched and deeply-rooted positions during discussions their willingness to negotiate and make concessions is essential, because it has the tendency to facilitate rapid resolution (ACAS, 2014; Hale *et al.,* 2012; Broughton and Cox, 2012; Bond, 2011; Heery and Nash, 2011; Ruhemann, 2010).

5. Discussion of Findings and Conclusion

The findings of this study reveal some of the similarities that exist in the nature and process of ADR and collective conciliation in the countries considered. For instance, it has become obvious that ADR institutions in the selected countries are publicly-funded, independent organisations that perform a wide selection of functions such as conciliation, mediation and arbitration services in both the public and private sectors. Assessment of the studies indicates that ADR is a non-statutory and non-adversarial method that provides the platform needed by employers and trade unions to resolve their differences of opinion and continue with negotiations without resorting to litigation. ADR has also been successfully incorporated into the civil procedure system made available for collective dispute resolution within these contexts. Thus, it suggests that the system of ADR is not influenced by government policies however; its structure and organisation may be modified by state regulations as evident in South Africa, the UK, Canada and Japan. The state plays a key role in the formulation of legislation that frames the employment relationship through its contractual dimension and specifically, concerning the recognition and integration of ADR as an alternative method for resolving workplace disputes. This implies that the state plays a significant role in the restructuring of the labour laws that make it possible for trade unions to engage with management in collective bargaining and alternative dispute. The importance of the neutrality of ADR institutions while carrying out their responsibilities and the ability of the state to provide financial assistance makes it easy for these ADR institutions to effectively provide voluntary and confidential as well as free services to trade unions and management representatives especially during dispute resolution. The key point to note from the countries under consideration is that conciliation is in operation within each context considered and the state is responsible for providing the financial assistance needed by the institutions to maintain their neutrality and provide confidential service. The role of the conciliator is important because; s/he provides a calm and informal atmosphere required for understanding the difficulties that the parties are faced with during resolution. Conciliators knowledge and experience in industrial relations enables them to offer suggestions to the parties about possible solutions and also build the confidence of the parties in the process and outcomes of conciliation. Be that as it may, this study asserts that irrespective of the approach or style that the conciliator decides to adopt during conciliation the principal aim of building a relationship and exploring the parties' points of view on the dispute, tends to provide a rapid resolution of dispute, increase trade union and management's commitment and support of the process and its outcome in practice.

In conclusion, this paper reveals how the meaning and significance attributed to ADR tends to influence its nature and determine its process as evident in South Africa, the United Kingdom, Canada and Japan. It demonstrates the importance of the role of the state especially in the formulation of legislations that frame the employment relationship, boost the recognition and integration of ADR as an alternative method for resolving workplace disputes, and its impact on the process of negotiations and outcomes of resolution. Another key finding that emerge from the analysis presented in this paper is the impact of the independence and objectivity of ADR institutions while carrying out their responsibilities. Using empirical evidence from the selected countries, this paper shows the extent which state provision of financial support to ADR institutions tends to give an impression among trade unions and management representative about the independence and impartiality of the process of conciliation as well as the objectivity of its outcomes. The importance of conciliator's tool of communication has been emphasized in this study. This study asserts that effective communication allows conciliators to reveal to the disputing parties the strengths and weaknesses of their case. Conciliators also share information on each party's position as well as the legislation in the course of communication. While relating with both parties through communication, Conciliators approach and personality tends to influence their choice of words and the extent, which this impacts on the parties' willingness to engage in negotiations and make compromise that will facilitate prompt resolution and sustain their existing relationship.

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Will a Collectivistic Culture protect your Intellectual Property? Effect of Individualism on Intellectual Property Protection

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Abstract

This study is intended to explore the effect of individualism on intellectual property rights protection. Using data from 92 countries, we found out that individualism index has positive and significant effect on IPR protection. More specifically, a 10-point increase in individualism index is associated with 0.4-point increase in IPR index. Moreover, individualism alone seems to explain nearly 45% of cross-national variation in IPR index. The mentioned significant effect remains robust even after considering the role of economic development, democracy, ethnic diversity, economic freedom and legal heritage.

Keywords: individualism, intellectual property rights protection, Latin America

1. Introduction

According to *The Software Alliance* - BSA (2009 p. 8) the commercial value of unlicensed software used in China scored $7.6 billion —$900 million more than 2008; Moreover, 'in 2009, the worldwide value of unlicensed software hit $51.4 billion. (BSA, 2009 p. 9). Therefore, understanding which tools can contribute to reduce the illegal use of software becomes a paramount research objective. Nill and Shultz (2009) assert that intellectual property rights (IPR) protection is instrumental to reducing software piracy rates across developed and developing countries. Indeed, Figure 1 suggests that IPR protection remains very heterogeneous across developed and developing countries. For example, while USA scored 7.7, Ukraine only got 3.9 points in the IPR protection index. Moreover, research evidence suggests that IPR protection is an important antecedent of Foreign Direct Investment FDI, technological development (Yi & Naghavi, 2017) and trade (Auriol et al., 2015). For example, Delgado et al. (2013), using data from 158 countries between 1993 and 2009, found out that implementation of Trade Intellectual Property Agreements TRIPS had sizeable effect on trade of knowledge intensive goods. Naturally, exploring antecedents of IPR protection has numerous implications for society. Chiang (2004) explores causes of IPR protection using a large set of macroeconomic and industry specific data. The author found that patent fillings are predicted by the quality of legal institutions such as corruption levels. Das et al (2014) further shows, using data from 68 countries, reports that '*a country's economic status and regulatory status emerge as the primary factors affecting music piracy*' (p.6). Furthermore, Park (2002) concluded that economic freedom and IPR protection are positively correlated across countries. In addition, economic development and trade openness are also controlled in the regression model. Odilova and Gu (2017) tested the hypothesis that culture, measured by cognitive capital, and democracy are related to IPR protection. Their study reports that the effect of cognitive skills is partially mediated by political institutions. In addition, they also show that culture explains more than 20% of cross-country variations in IPR protection.

In this study, we contribute to the existent literature by exploring the link between cultural factors and IPR protection. In particular, we test the hypothesis that *individualism dimension of culture is a significant predictor of IPR protection across developing and developed countries*. Related literature shows that individualism is an essential ingredient of socio-economic development. For example, Gorodnichenko and Roland (2011) concluded that individualistic societies motivate personal success, thus, foster innovative activities. On national level, innovation spurs economic growth and foster development. Nikolaev et al. (2017), using *pathogen prevalence index* as an instrument for individualism index, tested the hypothesis *that individualism is inversely related to income inequality*. Their findings suggest that '*societies with more individualistic values have significantly lower net income inequality*'. The results are robust even after controlling for a number of confounding factors such as economic development, legal origins, religion, human capital, other cultural values, economic institutions, and geographical controls (p. 30). Jha and Panda (2017) showed that individualism is a robust antecedent of corruption, even after controlling for democracy, religion, education and economic development. They also show that genetic distance and infectious diseases are significant predictors of individualism at the first stage. Drawing on this rich set of studies, is possible to conjecture that *individualistic societies should be associated with stronger IPR protection*. Our results showed that a 10-point increase in individualism index is associated with 0.4-point increase in IPR index. Moreover, individualism alone seems to explain nearly 45% of cross-national variation in IPR index.

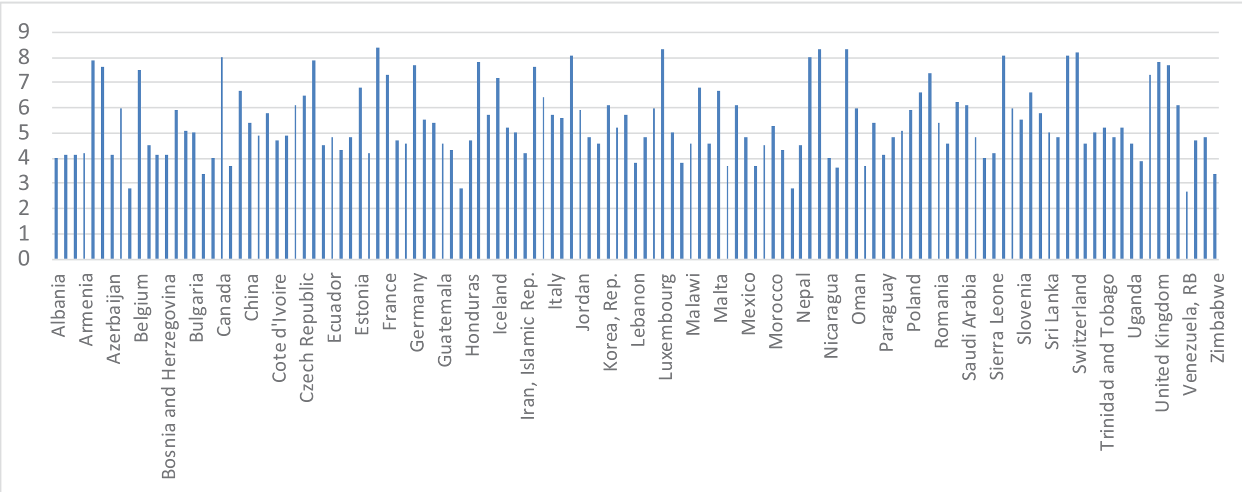

Figure 1. IPR protection index

Source: Property Rights Alliance

2. Data

2.1 Dependent Variable

Our first dependent variable is the International Property Rights (IPR) Index, the leading research output from Property Rights Alliance. The IPRI scores the underlining institutions of a strong property rights regime: the legal and political environment, physical property rights, and intellectual property rights. It is the world's only index entirely dedicated to the measurement of intellectual and physical property rights (http://internationalpropertyrightsindex.org/about).

As suggested by IPRI (2017)

The following are the three core components of the IPRI:

1. Legal and Political Environment, LP

2. Physical Property Rights, PPR

3. Intellectual Property Rights, IPR

The Legal and Political Environment (LP) component provides an insight into the strength of governance institutions of a country, the respect for the 'rules of the game' among citizens; consequently, the measures used for the LP are broad in scope. This component has a significant impact in the development and protection of physical and intellectual property rights.

The other two components of the index - Physical and Intellectual Property Rights (PPR and IPR) - reflect two forms of property rights, both of which are crucial to the economic development of a country. The items included in these two categories account for both de jure rights and de facto outcomes for the countries considered.

The overall grading scale of the IPRI ranges from [0 – 10], where 10 is the highest value for a property rights system and 0 is the lowest value (i.e. most negative) for a property rights system within a country. In our sample IPR index ranges from 2.7 in Venezuela to 8.4 in Finland.

Our second dependent variable is Intellectual property protection (IPP) index. IPP index is derived from opinion survey outcomes indicating a country's protection of intellectual property; thus, it is a predominant aspect of the IPR component. Expert participants in each country were asked to rate their nation's IP protection, scoring it from "weak and not enforced" (1) to "strong and enforced." (7). The data for this variable come from the Global Competitiveness Index from The World Economic Forum's 2015-2016.

2.2 Individualism

In this study, we rely on individualism index created by Hofstede (2001) as an indicator of individualism/collectivism across societies. The first edition of Hofstede (2001)'s I/C index was estimated using data from the surveys of IBM employees in forty nations. As asserted by Jha and Panda (2017 p. 5) '[the goal of the project was to estimate the] importance an employee assigns to different work goals such as challenges at work place (sense of personal accomplishment), desirable area to live, an opportunity for high earning, cooperation, opportunities for training, fringe benefits, recognition, physical working conditions, freedom of approach to adapt to the job, employment security, opportunity for advancement, relationship with the manager, opportunity to use skill and ability at work place, and personal time'. The final I/C index ranges from 0 (collectivistic) to 100 (individualistic) societies.

2.3 Control Variables

Considering that IPR protection is not explained solely by culture, as proxied by individualism index, we added a vector of control variables in our empirical exercise. We included, GDP per capita as a proxy for economic development from World Bank. We also control for democracy index from Freedom House and economic freedom from heritage foundation as proxies for quality of institutions. Finally, we also control for ethnic diversity index and binary variable for countries with UK legal origins, as a measure of legal heritage. Descriptive statistics and data sources are presented in Table 1. The correlation matrix is presented in Table 2.

2.4 Model

To test the effect of individualism on IPR protection we estimated the following econometric model:

$$IPR_i = \alpha + \beta INDIVIDUALISM_i + X\lambda + \varepsilon_i$$

Where IPR is one of our dependent variables in ith country, INDIVIDUALISM is an individualism index, X is a vector of control variables and e is an error term, satisfying normality assumptions.

Table 1. Descriptive statistics

Variable	Description	Mean	Std. Dev.	Min	Max
IPR index	International Property Rights (IPR) Index from Property Rights Aliance	5.43	1.44	2.7	8.4
IPP index	Intellectual property protection (IPP) index from World Economic Forum	4.06	1.03	1.68	6.31
Individualism	Individualism Index from Hofstede (2001)	39.17	22.07	6	91
GDP per capita	GDP per capita, at 000' PPP from World Bank	17.78	20.61	0.64	132.97
Economic freedom	Economic Freedom index from Heritage foundation	60.70	10.34	29.6	89.6
Democracy	Democracy index from Freedom House	4.66	1.98	1	7
Ethnic diversity	Ethnic Diversity index from Alesina et al. (2003)	0.44	0.26	0	0.93
UK common law	Dummy variable for countries with UK common law, and zero otherwise from Ashraf and Galor (2013)	0.34	0.47	0	1

Table 2. Correlation matrix

	I	II	III	IV	V	VI	VII	VIII
IPR index	1							
IPP index	0.9574	1						
Individualism	0.7077	0.6667	1					
GDP per capita	0.769	0.7187	0.5217	1				
Economic Freedom	0.8255	0.7758	0.5508	0.6359	1			
Democracy	0.5781	0.5074	0.5615	0.3082	0.6079	1		
Ethnic diversity	-0.3796	-0.323	-0.3475	-0.3166	-0.3229	-0.3205	1	
UK common law	0.0436	0.1168	0.0443	-0.037	0.0713	-0.1675	0.3571	1

3. Results

In column 1, we estimated a bivariate statistical model where we regress IPR index on individualism index only. This regression suggests that individualistic societies are associated with stronger enforcement of IPR protection. For example, a 10-points increase in individualism index was associated with 0.4-point increase in IPR index. Moreover, individualism alone seems to explain nearly 45% of cross-national variation in IPR index.

In column 2, we included GDP per capita. For example, Shoirova (2016) showed that culture and IPR protection is correlated with economic development both in low- and high-income countries. Moreover, Odilova and Xiaomin (2016) further showed that IPR protection is correlated with other growth determinants such as FDI. On the other hand, other scholars showed that individualism is significantly correlated with economic development (Ball, 2001). Therefore, it is important to control for the level of economic development. The results suggest that economic development is a significant predictor of IPR protection. In particular, a 10,000 USD increase in GDP per capita is associated with 0.4 point increase in IPR index. Individualism retains its significance, althought it has quantitatively decreased. This implies economic development captures some of the effect of individualism on IPR protection.

Next, we applied control for the economic freedom index in column 3. Economic freedom may serve as a good proxy for the quality of business environment in a country, thus may predict IPR protection. Our results suggest that economic freedom index has positive and significant effect on IPR protection. Moreover, individualism index remains positive and statistically significant.

In column 4, we incorporated democracy index. While the estimates for individualism, GDP per capita and economic freedom were positive and significant, democracy does not seem to be an important antecedent of IPR protection in our sample. In columns 5 and 6, we included ethnic diversity and a binary variable for countries with UK common law. Both of these variables are insignificant in our regression. However, individualism was significant across all regression specifications. Therefore, the results in Table 3 suggested that individualism is a robust determinant of IPR index.

Table 3. Individualism and IPR index

	(1)	(2)	(3)	(4)	(5)	(6)
Individualism	0.0435***	0.0253***	0.0179***	0.0160***	0.0158***	0.0150***
	(0.0051)	(0.0042)	(0.0034)	(0.0038)	(0.0039)	(0.0040)
GDP per capita		0.0435***	0.0249***	0.0262***	0.0259***	0.0266***
		(0.0051)	(0.0045)	(0.0047)	(0.0048)	(0.0048)
Economic freedom			0.0681***	0.0625***	0.0624***	0.0595***
			(0.0087)	(0.0104)	(0.0105)	(0.0109)
Democracy index				0.0631	0.0593	0.0752
				(0.0537)	(0.0544)	(0.0571)
Ethnic diversity					-0.1581	-0.2719
					(0.2887)	(0.3136)
UK common law						0.1486
						(0.1594)
cons	4.0180***	3.7385***	0.0700	0.1303	0.2408	0.3563
	(0.2304)	(0.1705)	(0.4860)	(0.5103)	(0.5508)	(0.5650)
N	89	88	88	87	87	87
adj. R^2	0.4530	0.7112	0.8312	0.8279	0.8264	0.8261

Standard errors in parentheses

* p<0.1, ** p<0.05, *** p<0.01

In Table 4, we re-estimated our baseline results using IPP index as a dependent variable. The relationship between individualism and IPR protection is positive and significant at 1% level across all models. After controlling for GDP per capita, economic freedom, democracy, ethnic diversity and legal origins, a 20-point increase in individualism index was associated with 0.2-point increase in IPP index (column 6).

Table 4. Individualism and IPP index

	(1)	(2)	(3)	(4)	(5)	(6)
Individualism	0.0303***	0.0178***	0.0128***	0.0133***	0.0134***	0.0116***
	(0.0039)	(0.0036)	(0.0032)	(0.0035)	(0.0036)	(0.0036)
GDP per capita		0.0300***	0.0169***	0.0167***	0.0169***	0.0183***
		(0.0042)	(0.0042)	(0.0044)	(0.0045)	(0.0045)
Economic freedom			0.0480***	0.0476***	0.0476***	0.0421***
			(0.0081)	(0.0099)	(0.0099)	(0.0102)
Democracy				-0.0050	-0.0029	0.0284
				(0.0497)	(0.0504)	(0.0520)
Ethnic diversity					0.0837	-0.1496
					(0.2728)	(0.2929)
UK common law						0.2896*
						(0.1463)
Constant	3.0824***	2.9035***	0.3049	0.3460	0.2865	0.5066
	(0.1769)	(0.1426)	(0.4559)	(0.4828)	(0.5229)	(0.5259)
N	92	91	91	90	90	90
adj. R^2	0.3938	0.6177	0.7241	0.7131	0.7100	0.7198

Standard errors in parentheses * p<0.1, ** p<0.05, *** p<0.01

In Table 5, we focused on one region of the world, namely Latin America. We regressed our dependent variables on individualism, dummy variable for Latin America countries and their interaction term. The results, reported in columns 1 and 2, suggested that the effect of individualism on IPR protection is marginally weaker in this region. One explanation may be that this region is associated with overall collectivistic cultures. On the other hand, the dummy variable for Latin America countries may capture unobserved characteristic such as colonization or endowment in natural resources such as oil, forest or copper. These resources hinder economic development and deteriorate legal institutions, so called resource curse phenomena.

Table 5. The effects in Latin America

	(1) IPR index	(2) IPP index
Individualism	0.0451***	0.0314***
	(0.0054)	(0.0042)
Latin America	0.7903	0.5917
	(0.5591)	(0.4826)
Individualism * Latin America	-0.0369*	-0.0290*
	(0.0197)	(0.0163)
Constant	3.9532***	3.0440***
	(0.2914)	(0.2134)
N	89	92
adj. R^2	0.4551	0.3967

Standard errors in parentheses * $p<0.1$, ** $p<0.05$, *** $p<0.01$

4. Conclusion

Software piracy and violation of copyright rules are still present across developed and developing countries. Several papers have shown that economic development, democratization, reduction of corruption and stronger legal environments can contribute to solve to this problem. Meanwhile, in the other hand, a separate strand of literature has shown that cultural dimension seem to be important antecedents of socio-economic development.

In this study, we have explored the role of one aspect of cultural values, namely individualism, in improving IPR protection across developed and developing countries. Our results suggested that a 10-point increase in individualism index is associated with 0.4-point increase in IPR index. Moreover, individualism alone seems to explain nearly 45% of cross-national variation in IPR index. These results indicate that apart from fostering economic development and strengthening legal institutions to reduce copyright violations, it is important to take into account the role of culture in modeling IPR protection using global data.

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Measuring Performance in Rail Freight Transportation Companies

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Abstract

Performance Measurement Systems - PMSs has become relevant for Organizations in the last years taking into consideration the broad approach and the strategic link which the current performance measurement is focused on. Brazilian railroad transportation has poor performance when compared with other similar countries. The rail transportation production has 25% of participation within total transportation matrix. Besides infrastructure aspects, management is the key for the improvement of this performance. A Performance Measurement System - PMS framework using Balanced Scorecard – BSC structure is proposed aiming to allow a more comprehensive and strategic performance measurement in railroad companies. A systematic approach was used for the literature review. Due to the lack in the literature related to the purpose of this paper a long period was considered for the search of references linked to performance measurement for railroads. Aiming to elaborate a PMS framework for railroad companies a case study method was applied in a large Brazilian railroad company. Semi-structured interviews and documental data collection were used in order to get evidences related to the processes, environment, customers and strategic objectives as perspectives needed to elaborate a PMS based on Balanced Scorecard. This case study applied in a large freight railroad company in Brazil allowed to understand typical strategic objectives as well as processes, customer's requirements and environment related to this kind of business. Balanced Scorecard was suitable to the performance measurement needs of the railroad company operation. It can measure operations performance comprehensively and strategically in an effective way. This study brings up important contribution in terms of PMS literature and it can be used as a reference guide for future researches focused on this field. Also it can be worth for practitioners who desire implement PMS in Organizations, not limited for railroad companies, but also for other kind of operations. This framework proposed is unique taking into consideration that there is no comprehensive PMS for a railroad companies using Balanced Scorecard structure. This same structure can be applied in more field researches seeking better understandings about performance measurement in freight railroad companies. Some research questions in order to solve future issues related to this study are proposed at the end of this paper.

Keywords: performance measurement, balanced scorecard, rail transportation, case study

1. Introduction

According to the Ministry of Transportation (2016), the Brazilian railroad system has 28,190 Km, present in the south, southeast and northeast, also taking part of the central west and north of the country. This is the biggest railway system in the Latin America. However when compared with USA system which has about 210,000 Km (Association of American Railroads, 2016), it is possible to verify the lack of railroad system development.

In 2014 it was transported 140.4 Million tons in the Brazilian system. More than 35% of freights exported from Brazil are transported by railroad to the Brazilian ports (Association of Brazilian Railroad Companies, 2016).

For the Ministry of Transportation (2012), as presented in Table 1, in countries with large territorial dimensions, such as Brazil, the share of railroad modal is more than 40% within the matrix. Brazil has only 25% of share in terms of railroad transportation

Table 1. Transportation Modes Share per Countries

Countries	Road	Railways	Waterways and Others
Russia	8%	81%	11%
United States	32%	43%	25%
Canada	43%	46%	11%
Austrália	53%	43%	4%
Brazil	58%	25%	17%
China	37%	50%	13%

According to Towson University (2016) the freight rail achieved in United States was about 2,847 billion of tku (tonne useful x kilometer) in 2015, followed by China with about 2,209 billion of tku and Russia with 2,075 billion of tku. This means that the productivity of US system is almost 9 times higher than Brazil that achieved 332 billion of tku (Association of Brazilian Railroad Companies, 2016)

According to data presented Brazil need to improve significantly its railroad transportation in order to achieve a more balanced transportation matrix. This poor performance impacts directly the country in the world trade, mainly because the country has a large dependency in commodities production which most of needs to be transported by train. It is clear that the infrastructure issues have a huge impact on this poor performance but management is also the key.

Thus, take this into consideration, an effective PMS for railroad transportation can support management decisions regarding operations matters. In this way, this research aims to present a PMS framework to be used by railroad companies. Also, this research brings contribution for the theory in terms of PMS applications.

This paper is structured as follows: next section will bring the literature review about performance measurement and in specific balanced scorecard. After that the research method will be presented and justified. In the sequence, empirical research with data collection and findings will be present. Lastly, conclusions and final remarks close this article.

2. Literature Review

2.1 Performance Measurement

Performance measurement has been one of the important topics for researches in the last two decades since them the broad perspective was defended by Eccles. For Eccles (1991), there was a need to stop of considering only financial indices as the basis for the performance measurement. A broader range of indicators became a necessity faced with the new competitive environment in 1990's.

Lebas (1995) consider that performance is defined as the potential for future success in the implementation of actions required to achieve the targets and objectives.

Neely, Gregory & Platts (1995) defines performance measurement as being "the process of quantification of the action, where measurement is the process of quantification and the action is what leads to the performance". For Neely, Gregory and Platts (1995) a system of measurement of performance must contain individual measures interrelated one each other pertaining to certain environment. According to these authors, when carrying through a project of a PMS some questions must be done:

Which measurements of performance are used?

Why are they being used?

How much will they cost?

What benefits can they offer?

Lebas (1995) states that the performance measurement and the performance management are not separated. According to author there is an interactive process between these two issues. PMS is the information system that is at the heart of the performance management process (Bititci, Carrie & Mcdevitt, 1997).

Thus, it is necessary in the performance measurement an approach beyond the financial focus. The qualitative factors of process and the stakeholders' satisfaction in the organization, like customers, employees and others are included in the news models of performance management, being linked to issues such as market, news technologies and economy, with necessarily, a connection with the strategic scope modern organizations.

The performance measurement must be part of the process control involving the strategic, tactical and operational levels, assessing through of a continual way the planning and the actions implemented under others views beyond the financial.

PMSs offer, through a set of information, a support to the process of performance management, which has a broader approach. In developing of a PMS it is important to understand the reasons, costs and utilizations of measures. It doesn´t make sense to have many measures without link with the corporate and operations strategy. Also, it cannot require huge effort to obtain measures, costing lots of money and taking so much time from people who are responsible for the performance measurement.

PMSs should have attention in terms of its evolution and stages of development. Authors as Van Aken et.al. (2005) and Wettstein & Kueng (2002), have proposed on the literature maturity framework in order to assess the evolutions of PMSs.

Newer PMSs consider this balanced structure for the performance measurement process. Some frameworks have been proposed in the literature as Performance Prism (Neely, Adams & Crowe, 2001) and Balanced Scorecard (Kaplan & Norton, 1996).

Some authors have strongly criticized the use of BSC as Voepel, Leibold & Eckhoff (2006). However this PMS has successfully been used for many world class companies in the world. Balanced Scorecard is certainly one of the most used PMS by the companies in the current context.

2.2 The Balanced Scorecard

The Balanced Scorecard was developed in 1990 from a work group from Nolan Norton Institute, which assisted the KPMG in research and development of new management models. The objective of the group was to create a model of measuring performance in organizations of the future, since the existing models until then were already considered obsolete. The leader of the study was David Norton, CEO from the Nolan Norton Institute at that time, being assisted by Robert Kaplan, acting as academic consultant. During the year of 1990, representatives of twelve companies from the sectors of manufacturing, services, heavy industry and high technology were brought together to develop the new model of performance evaluation.

According to Kaplan & Norton (1996), the organizations were contesting in complex environments where the understanding of their goals and methods to reach them, are vital aspects for their own survival. The authors say many service organizations, mainly transports, communications, economy and utilities exist over decades in a noncompetitive environment. However, the age of information has requested new potentialities for the competitive success.

For Kaplan & Norton (1996), the Balanced Scorecard measures the operational performance through 4 perspectives: financial, customers, processes and learning and growth.

Perspective of learning and growth is the basis for the processes. It is related to how company will support changes and improvement in order to achieve the corporate mission and vision. Perspective of processes is related to initiatives with regards to achieve excellence in business processes aiming to satisfy customers and consequently shareholders. Perspective of customers is related to initiatives about customer relationship and satisfaction. Lastly, financial perspective is the result from other three perspectives with regards financial results and satisfaction of shareholders.

Niven (2002) defines Balanced Scorecard as a careful set of measurements derived from the strategy of the organization. According to the author, the Balanced Scorecard represents a tool which the leaders can use when communicating with employees and external interested parties the results and the direction of performance through where the organization will reach its strategical mission and its objectives.

For Niven (2002), the BSC is a model that includes three functions:

- System of Measures;
- System of strategic management; and
- Tool of Communication.

According to Frost (2000), the BSC is a good example of system of performance measurement model that shows a vision of news perspectives, beyond of financial.

The objectives and measures of performance for the Balanced Scorecard are more than a collection of financial and non-financial measurements of performance. They are derived from of a top-down process application of the united business' mission and strategy (Kaplan & Norton, 1996)

According to Kaplan & Norton (2001), although each organization can achieve the alignment and strategical focus in many ways, in many places and in many sequences, each one use a common set of five principles as follows:

1) Translate the strategy to operational terms
2) Align the organization to the strategy
3) Make strategy everyone's Job
4) Make strategy a continual process
5) Mobilize change through executive leadership

In the first principle, the strategy must be transmitted following a logic architect of a strategic map and a group of balanced indicators, looking for specifying the details, the critical elements for strategies growth. This happens to create a common and understandable reference point through all the units in the business organization, also all their employees.

For Kaplan & Norton (2001) organizations are complex, building many times their numerous departments, business unities, specializes departments, having their own knowledge and culture.

For these authors, the functional divisions come and become the biggest obstacles for the implementation of the strategy that many organizations have great difficulties to communicate and coordinate these divisions. For the organizational development be more than the total amount of sum parts, individual strategies must be joined and integrated. By this idea it is presented the second principle of the organization focused on strategy.

The third principle contemplates the realization of the strategy for a daily work of all in between the organization. This principle requires that all employees understand the strategy and lead on a daily basis into the business to add for the implementation of its success. The executives can begin this process using the BSC to communicate and educate the organization about the strategy to be implemented (Kaplan & Norton, 2001)

On the forth principle, Kaplan & Norton (2001) establishes that the strategy must be accomplished by a continuum process, they say, many organizations build their management process through budgets and operational plans. According to them, the organizations introduce by BSC a double continuum process to manage the strategy. The process integrates the management tactics with management strategies, using three important processes which are the strategy linked to the budget process, the strategy review process, the learning and the strategy adaptation.

For Kaplan & Norton (2001), the four first principles focus on BSC as tool, structure and process to support them. For these authors, the strategy implementation requires changes for each part of the organization. Moreover, it also requires a team to coordinate these changes. For them the BSC program begins on the mobilization and the creation of a moment for the process to be released. Right after, the focus turns to be on the governance to implement a new development model. Finally and gradually, a new management system evolves into a system of strategic management which institutionalizes a new culture, values and processes into a new system to manage it. This can support strongly not only the performance measurement but also the performance management.

Then the BSC is more than just a PMS. It is also an instrument of strategic management, aiding in the clarifying and transmission of vision, communication and establishment of goals, planning and definition of the objectives and strategic feedback and learning. It allows company measure effective performance aligned with strategic objectives much more than only operational performance.

2.3 PMS for Rail Companies

A literature review was carried out in order to identify PMSs for railroad companies. According to Table 2 it is possible to verify that the PMS approaches are more related to benchmarking, efficiency, maintenance and infrastructure and sector analysis. There are no proposals with the objective to measure a railroad company as a whole. These proposals do not present a comprehensive framework in terms of perspective in an integrated structure.

In this way, it is possible to affirm that there is a lack with regards methods and frameworks to measure rail companies. Thus, this study can bring a novel research presenting a valuable framework for both practitioners and researches interested in rail companies' performance measurement.

Table 2. Performance Measurement Researches for Railways

Performance Measurement for Railways	*Research Scope*
Jorge-Moreno & Garcia-Gebrian (1999)	It is related to Performance of European Railway Industry. There is no PMS framework proposal. It has focus on production efficiency of Railways companies as a whole.
Walters (1999)	This research focuses on PMS for Property Management in a Railway Company. PMS considers only Customer Satisfaction Perspective.
Lan & Lin (2006)	The approach is related to performance measurement in terms of technical efficiency. It is applied a stochastic method making the comparison of performance of 39 worldwide railway systems.
Sajeev & Narayan (2008)	Study has focus on operational efficiency performance. There is no strategic approach and a PMS framework is not proposed. A DEA (Data Envelopment Analysis) methodology is used for the research.
Ahren & Aditya (2009)	Two case studies were carried out in order to identify indicators for maintenance (MPIs) and make a benchmarking between these railway companies. PMS framework with broad perspectives is not approached.
Stenstrom, Parida & Galar (2012)	PMS proposed for maintenance and infrastructure perspectives. Consider health, safety, and environment and maintenance aspects. There is no strategic and broad perspectives neither a cause-and-effect link between indicators.
Mir Ali, Ghaderi & Rostami (2013)	There is no PMS proposed based on BSC. It just presents some initiatives that were implemented since that BSC was implemented at Khorasan Railway Company
Sharma et.al. (2016)	Research was focused on measuring performance of Indian Railways in terms of efficiency of service. It has an operational perspective only using DEA methodology
Rajeev et.al. (2016)	Comparative performance between 16 Indian Railway Zones. There is no focus on PMS for performance measurement of Rail company itself.

3. Research Method

This research used a qualitative approach taking into consideration that there are not approaches with regards BSC for railroad companies. Also, the objective is to explore a phenomenon which is the application of the BSC for this kind of operations. As the most used method in qualitative approaches is the Case Study.

For Bryman & Bell (2007), the case study implicates in a detailed an intensive analysis of a simple case or multiple cases. A case study is involved into the complexity and the private nature of the case itself. Voss, Tsikriktsis & Frohlich (2002) define a case study as a description of a phenomenon, past or present, described from multiple evidences. The case study, according to the authors, may derive from direct observation or systematic interviews, as well as from public or private databases. They affirm that one of the advantages of this method is the possibility of studying the phenomenon in the specific context in which it occurs, allowing the whys and queens to be answered based on a systemic and holistic understanding of the phenomena studied.

The distinguishing feature of the case study lies in its ability to deal with a wide variety of evidence - documents, artefacts, interviews and observations (Yin, 2003). It is common to question the number of firms studied, especially in single case studies, but for Yin (2003) it is only justifiable in situations where the case represents a crucial test of the existing theory; or when the case is a rare or exclusive event or the case serves a revealing purpose. In addition, the single case study may involve only one unit of analysis (holistic).

The research method involved a case study carried out within a Brazilian freight railroad transport operator, with the aim to map overall operations and the its relation with the strategy in order to build the framework to be proposed on this article. This case can be considered as crucial since there are few railroads in the country and there is a strong similarity between the operations

As the collection instruments was used a semi-structure interview using a research protocol. This research protocol was elaborated based on the BSC structure. Documental data was used as well in order to gather more evidences about the research objective.

The steps executed on the research using the case study method were as follows:

1) Constructs for the Research Protocol as basis for interviews and documental data collection

2) Case Study Planning: Definition of unity analysis (areas of railroad company), people to be interviewed definition, sequence of questions and documentation collection

3) Data Collection: Execution of interviews and documentation and data collection (data about processes, railroad company areas, environment, strategic objectives, typical measures, stakeholders, customers' expectations and needs)

4) Data Analysis: Data was analyzed against BSC structure and concept. Data was analyzed in terms of strategic objectives, cause-and-effect between these objectives, processes in the departments or railroad company, environmental and stakeholder analysis, measure needs)

5) Theoretical Framework: Based on data analysis the theoretical framework was elaborated. It follows the structure of BSC strategic map in terms of measurement perspectives, cause-and-effect link and strategic link.

Figure 1 presents the theoretical framework. It was used as basis for the PMS formulated.

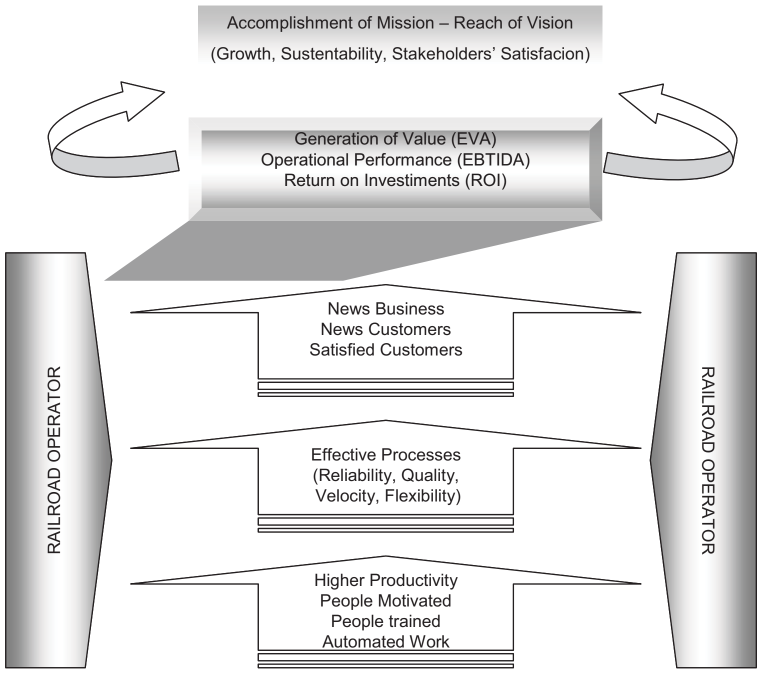

Figure 1. Presentation of the strategic map for BSC model

The theoretical framework present a bottom-up approach, which, from the perspective of learning and growth , keep processes more effective, which guarantee the satisfaction and retention of customers, seeking up achieving the financial objectives of the organization. The BSC as PMS for railroad companies was elaborated based on this theoretical framework. It will be present on the next section containing the performance measures according to each perspective of BSC structure.

4. BSC for Railroad Companies

This framework comes from the theoretical framework based on the Strategic Map of the company. The performance measures are divided by four BSC perspectives: learning and growth, processes, customers and financial, as follows in this text. In case of the processes perspective, in this paper will be present only operational processes perspective, due to its greater relevancy for the performance of the operator of freights railroad transportation. On the research measures were also proposed for administrative, commercial, procurement and information management processes.

PMS measures developed for the framework is as follows:

1) The Learning and Growth Perspective's Indicators

- Index of implementation in Information technology
- Index of implementation of training
- Index of retention in formation programs
- Index of employees' satisfaction
- Turn-over of employees
- Frequency tax (work accident)
- Index of occupational health
- Index of absenteeism

2) The Operational Processes Perspective's Indicators

- Locomotives productivity (tku/kgf)
- Wagons productivity (tku/kgf)

- Rail Productivity (tku/(km.km/h))
- Terminals utilization (%)
- Locomotives availability (%)
- Wagons availability (%)
- Terminals availability (%)
- Rail availability (%)
- Timeline accomplishment of recovery rolling materials projects (%)
- Timeline accomplishment of construction and recovery of rail projects (%)
- Locomotives reliability (%)
- Transit-time of trains (h)
- Cycle time of wagons (h)
- Utilization of the traction capacity (%)
- Utilization of wagon capacity (%)
- Index of Accidents (accident/million train x km)
- Loading efficiency (%)
- Unloading efficiency (%)
- Permanence time wagons in terminals (h)
- Waiting time of trucks in transhipment (h)
- Production of transportation efficiency (%)
- Energy efficiency of transport (l/tkb)
- Accuracy of production monthly planning (%)

3) The Customer Perspective's Indicators

- Index of accomplishment of contracts (%)
- Index of customers' satisfaction (%)
- Index of retention of customers (%)
- Index of prospection of customers (%)
- Index of market share in current business (%)
- Index of entrance in news business (%)
- Attendance flexibility to additional demand (%)
- Index of products mix increase (%)
- Commercial average speed (km/h)

4) The Financial Perspective's Indicators

- Profit per stock ($)
- EBTIDA – Earnings before taxes, interests, depreciation and amortization ($)
- ROI – Return on investment (%)
- EVA – Economic value added ($)
- TSR – Total shareholder return (%)
- Index of reduction of costs (%)
- Flows profitability ($/tku)

Each measure is linked to a strategic objective. For each measure was also established a formula and frequency of measurement. The Table 3 represents the Framework containing strategic objectives, measures, formula and frequency. For each perspective was developed a table as demonstrated on Table 3. This example is related to Operational Processes Perspective.

Table 3. BSC framework for Railroad Companies

OPERATIONAL PROCESSES PERSPECTIVE			
STRATEGIC OBJECTIVE	**INDICATOR**	**FORMULA**	**FREQUENCY**
Maximize Assets Productivity	Locomotives Productivity (tku/kgf)	[(tku generated)/(total of Kgf available)]	Monthly
	Wagons Productivity (tku/vagão)	[(tku generated)/(Wagons avalilable)]	Monthly
	Rail Productivity (tku/(km/h)xkm)	[(tku generated)/(rail availability)]	Monthly
	Terminals Utilization (%)	[(carloads performed)/(Terminal Capacity]x100	Monthly
Maximize the Availability and Guarantee the Reliability of Assets In order to achieve the excellence of Maintenance Management	Locomotive Availability (%)	$\sum_{I=1}^{N}$ [Kgf.h available/ Total Kgf.h] x100/N N= Days accumulated on moth	Monthly/Daily
	Acomplishment of Projects Deadlines for undercarriage recovery (%)	[(Project activities finished on time)/(Total of Projects Predicted)]x100	Monthly
	Locomotive Reliability (Mean Km betwwen failures) (Km)	$\sum_{I=1}^{N}$ [Km performed/ Total failures]/N N= Days accumulated on month	Monthly/Daily
	Wagons Availability (%)	$\sum_{I=1}^{N}$ [Wagon.h available/ Total Wagons.h] x 100/N N= Days accumulated on month	Monthly/Daily
Maximize Rail Availability and Guarantee Project Deliverables aiming the excellence on Rail Management	Rail Availability (Km/h)xKm	$\sum_{I=1}^{N}$ [$\sum_{i=1}^{n}$(Distance of strech i)x(Veloc. strech] I /N N= Days accumulated on month n= number of streches	Monthly/Daily
	Accomplishment of Projects Deadline for Rail Infrastructure and Superstructure (%)	[(Project Finished on Time)/(Total or Projects Planned)]x100	Monthly

Continuation of Table 3

Guarantee Production Exellence on Transportation and Handling Operations	Transportation Production Efficiency (%)	$\sum_{I=1}^{N}[(\text{tku performed})/\text{ dku planned})]\ I\ \text{x100/N}$ N= Days accumulated on month	Monthly/Daily
	Load Efficiency (%)	$\sum_{I=1}^{N}[(\text{Wagons loaded})/(\text{Wagons planned}]\ I\ \text{x100/N}$ N= Days accumulated on month	Monthly/Daily
	Wagons Unload Efficiency (%)	$\sum_{I=1}^{N}[(\text{Wagons unloaded})/(\text{Wagons planned})]\ I\ \text{x100/N}$ N= Days accumulated on month	Monthly/Daily
Guarantee and Improve Terminal Operations In order to Achieve Execellence on Load and Unload Operations	Terminals Availability (%)	$\sum_{I=1}^{N}[(\text{Total of hours available/ Total hours}]\ I\ \text{x100/N}$ N= Days accumulated on month	Monthly/Daily
	Wagons time in Terminal (hours)	$\sum_{I=1}^{N}[\sum_{i=1}^{n}(\text{Time of Permanence } i)/n]\ I\ /N$ N= Days accumulated on month n= number of Wagons	Monthly/Daily
	Load Capacity Utilization (%)	$\sum_{I=1}^{N}[\sum_{i=1}^{n}(\text{tu loaded in Wagon/ Wagon Capacity})i\ /n]\ I\ \text{x100/N}$ N= Days accumulated on month *tu = useful tonne n= number of wagons	Monthly/Daily
	Time of Wait in Line of Truchs for Transhipment (hours)	$\sum_{I=1}^{N}[\sum_{i=1}^{n}(\text{Full unload Time } i)/n]\ I\ /N$ N= Days accumulated on month n= number of trucks	Monthly/Daily

Continuation of Table 3

Guarantee execellence on Planning Activities	Effectivenes Delivery to Internal Customers (%)	[(Total of Demands Done)/(Total of Demands Planned)]x100	Monthly
	Efficiency on New Service Projects (%)	[(Projects Finished on time)/(Total of Projects Planned)]x100	Monthly
	Accuracy on Production Plan (%)	[(tku performed + losses tku not planned)/(total of tku planned)]x100	Monthly
Guarantee and Improve Trains Circulation In order to achieve excellence on transportation operations	Transit-Time of Trains (hours)	$\sum_{I=1}^{N} [\sum_{i=1}^{n} (\text{Time between Origin and Destiny } i / n] \text{ I } / N$ N= Days accumulated on month n= number of trains	Monthly/Daily
	Wagons Cycle Time (hours)	$\sum_{I=1}^{N} [\sum_{i=1}^{n} (\text{time between Origin and Destiny } i / n] \text{ I } / N$ N= Days acumulated on month n= number of wagons	Monthly/Daily
	Traction Capacity Utilization(%)	$\sum_{I=1}^{N} [\sum_{i=1}^{n} (\text{tb pulled/ tb of train-type) } i / n] \text{ I } x100/N$ N= Days accumulated on month n= number of trains * tb = gross tonne	Monthly/Daily
	Accident Index (Accident/million train.Km)	(Accidents Ocurred)/[(Total of trains on month x Km performed)/1,000.000]	Monthly
	Energetic Efficiency (l/tkb)	(Total fuel consumed)/(tkb total pulled) *tkb = gross tonne km	Monthly

5. Conclusion and Final Remarks

Railroad Transportation is the key for the more balanced transportation matrix in Brazil. Methods and theories can contribute to leverage the share of railroad transportation with regards total of goods to be moved. PMS has important role on the railroad performance management. However, literature review shows that most of PMS proposed are concentrated on operational, maintenance and sector aspects. Comprehensive, strategic and cause-and-effect PMSs are not considered by these proposals. This is against general theory of modern PMSs.

In order to try to fill this gap, this research aimed to present a PMS framework to be applicable at Railroad Companies. To elaborate this model, a case study was developed in a large Railroad Brazilian Company in order to understand the strategic objectives in terms of learning and growth, processes, customers and financial perspectives, This was necessary due to the choice of BSC structure as a basis for the PMS constructs.

It was possible to verify the suitability of BSC structure for the railroad companies. Also, evidences shows the real needs in have a strategic and broad perspective to properly measure railroad operations.

This research brings up significant for the PMS theory related to railways as study object once current PMSs proposed are not enough to effectively support the performance measurement needs from the Railroad companies' perspective. Also, it can be a reference guide for practitioners interested in implements effective PMSs into their organizations and in specific in Railroad Companies. From the Brazilian perspective, this PMS can help the improvement of Brazilian companies impacting on their performance management and consequently in a more balanced transportation matrix.

Future researches can be done in order to understand a little bit more aspects related to implementation and impacts with regards BSC adoption in Railways. Some research questions can be useful as reference for future studies as surveys, action researches and case studies as follows:

- What the impacts of BSC adoption in Railroads outcomes?
- What the barriers to implement BSC in Railroad Companies?
- Is the BSC effective to accomplish and support Railroad strategic objectives?
- How to effectively implement the BSC in Railways organizations?

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Impact of Financial Aid Branding on Public Perception and Favourability

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Abstract

Since last four or five decades financial aid has remained a major source of finance for underdeveloped and developing countries. Despite giving impressively large amount of aid donors are disappointed in getting to the mark of achieving the good image and favourability from beneficiaries. Hence to create awareness and developing good image amongst the recipient nations, donors have started financial aid branding (Reinhardt, 2010). The basic intent of the present study is to investigate the rationale and impact of financial aid branding to shape public perception about donors. This inquiry is informed by qualitative inductive approach based on semi-structured interviews, conducted from a sample of twenty four Pakistani citizens.

The research findings revealed that USAID is the most popular donor amongst Pakistani nation because of intensive branding strategy as compare to other bilateral aid donors. USAID is making its contribution visible through all possible mediums (electronic and print media). The most prominent strategy used is to adhere USAID logo on all items that recipients receive under USAID grant, with a prime motive to revert negative sentiments of Pakistanis and win their minds and hearts. The results exposed that branding have somehow positive impact on people sentiments. But minds and hearts of people, who are well aware of the underlying motives of America, cannot be easily compelled to believe otherwise.

Keywords: financial aid branding, developing countries, good image, USAID

1. Background

Foreign aid has always remained a major source of funding for underdeveloped or developing countries. The tormenting point major donors observed is that despite giving such huge amount of aid they miss the mark of getting credit and good name amongst recipient nations specially where donors' image is not good. As media is a powerful tool that portrays image of other countries in a striking way. It has significant potency to construct the image among people's mind. For that reason donors have deliberately started branding and publicising financial aid so that the recipient nations may get aware about the aid and donor ultimately lead to create good image among such nations/ countries where they have specific image problem.

The branding of financial aid by donors is a significant area but has limited literature. Public perception is considered a dynamic part of a democratic society having power to influence and shape the government decisions. The current study is conducted to explore the public perception about strong financial aid branding and its impact. Findings of this study may help the policy maker and academia to understand the impact of strong financial aid branding. In addition the donor may understand the public perception of financial aid branding in Pakistani market.

2. Financial Aid Branding

The process of developing images and words (logos or slogans) to create an uniqueness of a product or service is known as Branding. Functioning with any donor, branding strategy must be develop and implement by recipient of aid that could meet the donor's requirements as it is a decent practice to create branding strategy (NGO Connect e news, 2009). Since the brand matters, message from a trusted organization will be significantly more valid (Hutchinson & Rothwell. 2002).

Financial aid donors like Australia (Aus Aid), Canada (Canadian aid), UK (UK aid) and USA (USAID) spend substantial amount on branding in order to earn the credit of their contribution, to be more visible and win mind and hearts of recipients. While some donors do not focus much on branding. Among various sources of branding and publicity, television has remained the most dominant medium. Other sources inclue billboards, newspaper and radio that knowingly influence the public opinion and views (Sultana, 2007). Donors used media for branding because media is a powerful tool that shapes the mind set of individuals. It has always influenced opinions and behaviour of people and represent other countries images in a striking way (Saleem,n.d).

Australian Aid branding policy in recipient countries

According to Australian government appreciation of the development role can be maximises through correct branding which will also increase the accountability and transparency of Australia's aid program. So for enhancing the visibility of the Australian aid, AAI (Australian Aid Identifier) is made possible by adhering it on all products and activities related to aid programme. It was updated in November 2013 and all recipients were directed to use updated Australian logo to brand all assistance and development activities provided abroad by the Australian Government (Australia Golobal Alumni. 2016).

Figure 1. Approved versions of Australian Aid

Source: Branding aid projects and initiatives.

Canadian International Development Agency Branding Policy

In order to make Canadian and population of aid recipient countries aware of Canada's contribution, the government has developed a policy to use wordmark on communication products and infrastructure delivered with Canadian support. Through this they will remain prominent and influential and their work can be easily identified helping to advance Canada's interest and values internationally (GC, 2016).

UK Aid Branding Policy

In June 2012 Andrew Mitchell, Secretary of UKs' International Development said "the credit Britain deserves for tackling global poverty, has not received for too long. In the development society some have been disinclined to 'badge' the aid under UK with Union Flag". So UK has decided to change the branding policy.It is important that aid from Britain should be identified easily and clearly by the people around the world (covering all areas like villages, towns and cities) (Uk, 2012).

Now new logo is marked with Union Flag. All aid-related products sent abroad, will be clearly marked with this symbol meanings that it comes from the United Kingdom. The new logo will help to drive the credit that Britain deserves. Branding of UK aid is not restricted just to the use of logo. It take account of what they say and write. UK-aid logo is now displayed on all items of supplies, such as, emergency grain packets, schools and water pumps. Recipients should also concede funding in press releases, public declarations on social media, in any interview and in other public communications that it is from UK government. (UK aid branding guidance, 2014).

USAID Branding Policy

USAID, is an independent federal government agency of USA. It is delivering humanitarian and economic assistance in the complince of overseas growth plans of America (Tabbasum, 2014). One of its ais to provide better living conditions to developing nations and the other one is to create a market for USA (NGO Connect e news, 2009).

USAID Standard Graphic Identity there in after referred to as "USAID logo" builds upon the recognition and brand-equity developed over more than 65 years of U.S. foreign aid. The USAID logo descended directly from the logo of Marshall Plan, created when Congress became aware that credit was being taken by Soviet Union for the poorly marked donations by USA to needy nations. In the course of the last 50 years, the handclasp of USAID has turned out to be outstanding amongst other known U.S. logos. USAID logo at different periods of the history are shown in Table 1.

Table 1. USAID logo during different periods

Year	1948	1953	1992	1995	2001	2004
USAID-LOGO						

Source: USAID graphics, 2016

"USAID's brand is more than a logo. It reflects the unique values and principles of the Agency to a worldwide audience. Furthermore, it shows goodwill of the American individuals in giving help to needy nations. According to the USAID team "we have all "earned" our brand by doing hard things well, often in the most challenging environments" (USAID graphics, 2016).

USAID designed its branding policy by amending 641section of foreign assistance act 1961 as a means to increase the visibility of USAID and its work (USAID, 2014). In 2002, USAID launched a new branding policy, requiring all AID-funded programs, projects, activities, public communications, and supplies be branded or marked with the "USAID Identity" (Reinhardt, 2010). The USAID brand is issued to all partners, government recipients of US aid, and each is required to display the USAID brand at worksites, on finished products, and on distributed items, such as pamphlets, food packets, or textbooks (USAID, 2009).

In the aftermath of the 2004/2005 the value of the increased visibility of foreign aid was admired strongly. As USAID's updated "brand identity" was first time used publicly during tsunami relief endeavours. In 2004, study conducted by State Department revealed that in many Muslim nations the favourable opinions for America were at highest record. In early 2005, the aftereffect of first time "well branded" foreign aid efforts by U.S doubled (from 37 to 66 percent) the favourability of USA in Indonesia (USAID, 2014).

There are different views regarding strong branding policy of USAID. The Obama administration argued that USAID branding upsurges transparency. Some are of the view that USAID has found a way to pursue growth while also needs to win the hearts and minds of people. That's why the Agency is making decisions about where to send aid based on projects that are most easily brand able, rather than "most worthy"(Reinhardt, 2011).

While a leading Republican presidential candidate, son and brother of some former US Presidents and former Florida Governor Jeb Bush says that "America should not buy friends by using foreign aid, detecting that friendship of Pakistani nation was failed to buy through these efforts and it is not the appropriate use of financial aid" expressed in an interview to fox news. Further he said our financial aid should be a sign of free market philosophy economically and our values. Aid should not be directed to nations that put off their interest in reforming so that people can rise up. He says that foreign aid will never work if it is used to win friends. Moreover, conditions applied with aid are also inappropriate (Bush, 2015).

According to Mr. Bush (2015) USA should think from the side of people as opposed to supporting administrations that smother goals of their kin. Foreign aid should help them in understanding the meaning of freedom, free market economies and freedom of our nation. It's a waste of money that just given to support the despots for maintaining their presence (Bush, 2015).

3. Financial Aid donors to Pakistan

Pakistan, since its birth, has remained an aid-dependent nation especially during the 1960s, 70s and 80s; Pakistan is reported as one of the largest aid recipients in Asia (Zaidi, 2009). Pakistan, like other developing nations, has remained economically stagnant and more hooked on aid, in spite of receiving large quantities of financial aid (Javid & Qayyum, 2011). Different terms and conditions imposed by donors, due to economic and strategic interest in Pakistan, are most important issues badly affecting the growth process of the country (Le & Ataullah, 2001).

There are number of donors working for the betterment of Pakistan some of them are shown in Table 2 along with their logos.

Table 2. Bilateral aid donors to Pakistan and their logos

Australian Aid	
Canadian International Development Agency	
United Kingdom's Department for International Development (DFID)	
Japan International Cooperation Agency (JICA),	
Norway	
Netherlands	
Germany	
Swiss Development Cooperation (SDC)	
China	
Saudi Arab	
United States Agency for International Development	

Source: Pakistan Donor profile (2014)

USAID Branding in Pakistan

The Interim Strategy (2003–2007) of USA defined the objectives of USAID in Pakistan to promote stability, equality, economic growth and improve the well-being of Pakistani people (Tabbasum, 2014). In Pakistan sturdy USAID branding is the result of success of branding in Indonesia. As Tsunami relief efforts symbolize the first wide-scale use of the USAID brand every box of blankets, every container of food, every crate of water bottles, every individual water bottle, was labelled as being "FROM THE AMERICAN PEOPLE."as shown in Figure 2

Figure 2. USAID logo for Pakistan

Source: USAID branding (2017)

Americans are among those who are facing acute image problems, more probebly in Islamic world (Khan & Safdar, 2010). Among Islamic countries, particularly in Pakistan anti-American sentiments have been evident due to range of reasons such as the assassination of Osama bin Laden by USA military operation, USA drone attacks in northwest region of the Pakistan, USA pressure to launch a military operation in North Waziristan and Public and political pressure on Pakistan government to stop NATO supplies (Saleem & Mian2014). Large portion of Pakistani nation considered American policies unfair and hold negative image of USA (Khan & Safdar, 2010). Pew Research Centre (2012) survey shows that almost 74% of Pakistanis viewed USA as an enemy state. Moreover, 40% people believed that US aid was having a negative impact on Pakistan's economy (Khan & Safdar, 2010). Therefore, U.S assistances is facing single most important challenge of winning public confidence and credibility in Pakistan (Naviwala, 2010).

USAID branding has been controversial in Pakistan as USAID programs accompanied objectives of economic growth, export expansion and poverty mitigation however none of these objectives seem to have been realized because they are focusing too much on strong branding rather on development (Tabbasum, 2014). The intention behind strong branding is that being visible would enable U.S to "win hearts and minds" in Pakistan (Naviwala, 2010). In Indonesia, the world's largest Muslim country, USAID branding marked public view shift both in favour of the USA and against Osama Bin Laden and terrorism, over the course of the tsunami events. The USA Senate went on to the same in Pakistan to urge that the USA "take the lead" in Pakistani earthquake relief efforts in October 2005(Reinhardt, 2011). Similarly, during July 2010 flood in Pakistan gave another chance to USA to build positive image as report delivered to the Congress, it was stated that the "positive side of 2010 flood is that it gives the U.S. an opportunity to lend humanitarian aid and therefore "Improve its poor image among Pakistanis"(Yu, 2011).

Figure 3. USAID Logo on goods from America

Source: USAID branding.(2017)

USAID has become more involved in public diplomacy to overcome unfortunate legacy of Pakistani nation's distrust. It focuses on strong branding policy through media as media plays vital role in lives of people (Sultana, 2007). USAID is engaged in its financial aid branding through all possible mediums as evident from more or less all TV channels, websites, social networks, FM Radio, billboards and banners in major cities, and other possible communication channels (Naviwala, 2010).

Roshan Pakistan is the largest USAID ad campaign run by USAID in Pakistan, see Figure 4. It communicates message in such a soft way that listener or reader can transform its feelings easily. If some Pakistanies have negative sentiments towards America by observing the ads focused on few USAID activities in specific sectors s/he may positivly change his or her openion. Roshan Pakistan is a campaign that does not present anyone as a sufferer looking for help – no pictures of outrageous destitution, dreary living conditions, innocent children away from school and so on; neither it depict improvement as a straight forward procedure by promising moment change like other social sector campaigns do at national and international level. This campaign has just expanded the general consciousness of USAID as a brand (Huda, 2013).

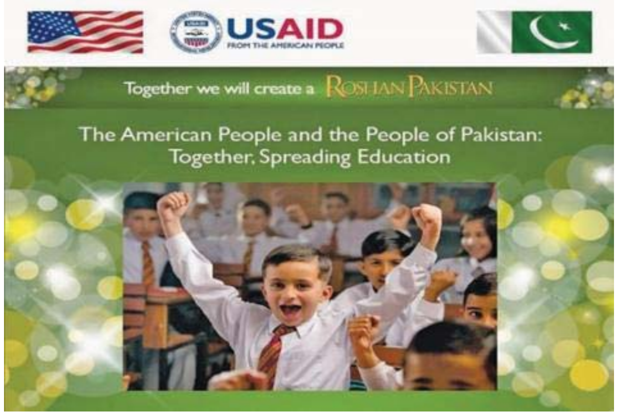

Figure 4. USAID Commercial in Pakistani Media

Source: Huda, A. (2013)

USAID branding in Pakistan is done in such a way that every common person consider America as their true associate. They are trying to make people think otherwise that a lot if not every thing in Pakistan is done with the help of America. They are friendly to Pakistan and helping in developmental work (Huda, 2013).

4. Brand Equity Theory

Branding is by no means a new phenomenon. By the mid of 20th century contemporary branding theories and its evolution took a starting point (Hampf & Repo, 2011). For the current study brand equity concept given by Keller is adopted. According to hime brand equity is the value of brand which in itself a function of high brand loyalty and awareness of brand name. In order to achieve strong brand equity one should follow the four steps (brand identity, meaning, responses and relationship) consist of six building blocks. These six blocks are salience (first step), performance, imagery (second step), judgments, feelings (third step) and resonance (forth step). The last block is resonance placed at the top of pyramid, and is considered most difficult and desirable level. It is achieved when deep psychological bond build with brand (Keller, 2002).

USAID is the financial aid donor which developed its brand on the basis of brand equity theory to build good relations with the nation of recipient countries (USAID graphics, 2016). So the recipient nations may get aware about the aid and donor ultimately lead to create good image among such nations/ countries where they have specific image problem.

5. Research Methodology

This exploratory research employs an inductive approach to study individual's responses. This cross sectional study was based on qualitative method that emphasizes the quality of meaning in individuals' perceptions and understanding (Collis & Hussey, 2003). The non-probability, convenience sampling was used to select the sample of 24 people, covering employed personnel, students, households and business men, as these groups are important representative segments of any society and sufficient to provide alternative viewpoints. From first two categories (employees and students) interviews were conducted from male and female subjects whereas from the last two categories households and businessmen only females and males were interviewed respectively at different places as per their convenience.

For ethical consideration, a consent form was used to seek the consent and willingness of the respondents to participate in the study. Semi-structured interviews were conducted from said sample by approaching them at different places as per subjects' convenience. The interviews began with some demographic warm up questions leading to specific topic. All interviews were conducted in Urdu (Pakistani National language) which lasted for approximately 30 minutes. Interviews were also recorded with permission of respondents and later translated in English. Subjects' statements were analysed by key words and phrases identifying the perceptions and feelings of participants regarding research questions. After twenty four interviews the researcher reached at the point of saturation and stopped additional interviews (Glaser & Strauss, 1967; Strauss & Corbin, 1998; Goulding, 2005).

6. Data Analysis and Discussion

The interviews were started by showing brands of different financial aid donors. The data was analyzed for key words and phrases (most repeated words and phrases) that identify the perceptions and feelings of participants regarding research questions. Respondents were asked to identify the brand which they see more frequently as shown in Table 2. About 92% (22/24) respondents were aware of the USAID brand. Whereas, two (2/24) respondents were aware of AusAID and only one (1/24) knew the JICA. Other brands were not identified/recognized by the respondents.

Most of the subjects come to know about USAID brand through different mediums, such as TV ads, newspaper, print media etc. Most of the student respondents come to know about USAID brand through their universities (pamphlets on boards, logo paste on everything granted by USAID) and advertisements. Whereas, the households got familiarized through T.V commercial tiled "Roshan Hai Zameen", which was the largest campaign run by USAID in early 2012 (Huda, 2013) and 2017. While remaining respondents come to know about USAID through other social media, newspaper or the logo paste on items given by USAID under different projects. While few have affiliation with donor which ultimately resulted in brand awareness.

"Advertisement on media (TV, newspaper) and through internet." (Respondents 3)

"I came to know about USAID from my university where i used to study." (Respondent 4)

"Once we were working, a man came and gave us caps. There was its monogram on those caps" (Respondent 24)

"I worked with USAID funded project during an official assignment." (Respondent 1)

The subjects were asked how long they do know about this specific brand, the responses disclose that the average time period from which they know USAID is about 7 years. As the branding policy of USAID has been started publicly after the 2005 earth quake in Pakistan which was the result of successful branding policy after tsunami hit in 2004 (USAID, 2016), so it can be infer that 83 % (20/24) of respondents come to know about USAID after 2005.

"Since 10 to 11 years." (Respondent 1, 8)

"For About 7 years."(Respondent 2, 15, 16)

"Since 4 or 5 years.*"*(Respondent 3, 5)

The next query was related to the brand ipmpact. Most of the respondents think that brand has strong impact on public perception, as the brand lives and evolves in the minds and hearts of viewers. The statements reveal that strong brand can create good public image, about 79% (19/24) respondents were of this view.

"Yes, I think that a strong brand can easily build a positive image through it philosophy." (Respondent 3)

*"Yes, strong brand can create good public image .....advertisement*s." (Respondent 5)

"Yes." (Respondent 6, 10, 11, 12, 13, 16, 17, 18,24)

Then respndants were asked which donor is spending much amount on its branding and why. Most of the financial aid donors have promoted their brands but USAID is the one spending much amount on its branding and deal it as a policy matter. The comebacks reveal that except few respondents (3 out of 24) all other think that USAID is the one who spends greater amount on branding.

"USAID in my views."(Respondent 1)

"USAID."(Respondent 2,6,8,9,10,12,13,14,15,16,17,18)

USAID is spending much amount on its branding for different reasons. Some people think USA wants to create good image among the Pakistani nation by making aid more visible. When people observe a lot of aid from American people their minds might change and positive thinking may emerge. Some think that they want to use our territory for their interests. While other are of the view that they want to control this country. One or the other way their first aim is to develop good image in Pakistan in order to carry out their other motives. Such as if they become successful in winning minds and hearts of Pakistani nation they can easily implement their policies which will be definitely in the interest of USA. Or they can easily use this territory for their benefits for instance when people accept them as their friend they will not cause any trouble for them.

"Creating good image in the minds of Pakistani people and develop love and affection for USA."(Respondent 1)

"USAID is spending much amount because they want to change peoples (especially educated persons) perception ...image positive".(Respondent 4)

"I am not aware of its latent policies. But i am quite sure that USAID is promoting American mind set, American ideology."(Respondent 6)

"*In order to attract people and to create favourable situations in areas where they are working."*(Respondent 12)

"*To create good image among Pakistani nation and show that they are good friends, and on other* *hand sing our territory against the same nation*." (Respondent 15)

"They want to create good will in Pakistan with a motive to control it." (Respondent 18)

People perceive branding as a tool that has positive impact on public sentiments. They think that it is easy for USA to capture the minds and hearts of illiterate people as compare to the literate, and to those who are aware of hidden motives cannot be easily trapped. However, their efforts have some positive results means there is positive impact of strong branding on public sentiments which they actually want.

"Yes… if for a while we ignore their interest in our country (Pakistan), branding is the way these countries can influence the citizens of our country positively and also the way to spread their message and purpose, which also helps in building good image."(Respondent 3)

"Of course there is strong positive impact."(Respondent 6)

"Yes, they can influence illiterate people through their branding activities easily as compared to literate people."(Respondent 17)

"Yes, the people who have negative sentiments for America will be change positively if they are beneficiaries… in emotions."(Respondent 18)

7. Conclusion

The findings reveales that USAID as a brand has gained more popularity amongst Pakistani nation as compare to other bilateral aid donors. USAID started its proper branding after tsunami hit of 2004 about 12 to 13 years ago and on average people get aware of USAID brand in Pakistan since last 7 years. This indicates that their branding strategy has worked out appreciatively in Pakistan. The respondents come to know about this brand through different mediums such as TV commercials, billboards, and USAID logo adhered on each item received by USAID. By using different mediums for branding USA in point of fact targeted the entire nation which is evident from responses. Since evident from literature findings of Huda (2013) and respondents of the current study that USAID is the only financial aid donor spending greater amount on its' branding to win minds and hearts of Pakistani nation as compare to any other international donors. The respondent's perception also exposed that USAID is somehow efficacious in attainment of their goal specially by attracting illiterate people. The finding supports the concept of *brand equity* (keller, 2002), as under this theory branding is focused on building positive perception of people about the brand to form vigorous relationships between individuals and the specific organization. USAID as a donor used this concept of *brand equity* to win the minds and hearts of Pakistani nation. Although it is difficult to change the mind of those people who are well aware of the hidden motives of America behind this branding strategy.

8. Limitations and Recommendations

The scope of this research is limited in the form of generalizability, as sample includes only few citizens of Quetta city and perception regarding motives of financial aid donors may differ from region to region. So it is recommended that future studies should take into account this factor and sample should also be selected from other regions of Pakistan for generalizability of the results.

Furthermore, due to lack of resources both time and financial it was unfeasible to conduct the study on large scale. As this was a qualitative study later on quantitative study may be performed. Moreover, the data was collected from urban setup totally ignoring the people of rural areas. Next study may take into account the importance of this ignored area and comparative study may be conducted

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The Impact of Customer Relationship Management on Long-term Customers' Loyalty in the Palestinian Banking Industry

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Abstract

This paper aims to investigate the impact of customer relationship management on Long-term Customers' Loyalty in the Palestinian banking industry. The data was collected through distributing questionnaires on the Palestinian banking employees. Using multiple regression analysis tests, this paper finds these results; there is a positive and strong linear relationship between dependent variable "long-term customers' loyalty" and CRM, the CRM dimensions are service quality, customer's database, solving customer's problems, employees behavior, and CRM system integration. At the end, the two predictors (employee's behavior and CRM system integration) explained 48.2% of the variance in the long-term customers' loyalty. The scholars' found that banks have to investigate why there is a difference in the service quality level between male and female employees where male employees more effective than females. Furthermore, banks need to update their customers' database in order to be alerted to changes in their customers' requirements and needs to retain their loyal relationships with customers.

Keywords: CRM, Customer relationship management, long-term customers' loyalty, service quality, customer's database, solving customer's problems, employees behavior and CRM system integration

1. Introduction

The Palestinian banking industry has a significant role in the local development by providing the financial support in order to help the citizens to establish new businesses and provide them with the financial aid to let them cope with financial risks related to the unstable situation in Palestine, and on the other side, it helps them to ensure a secure a fund source to grant them with the required liquidity. Banks compete in the Palestinian local market to provide the proper borrowing facilities and procedures that are aligned with the customers' needs and expectation because in there are many cases citizens' have lack of requirements and guarantees to earn the required financial aid. So the Banks undertake these procedures in order to build a strong relationship with its customers to satisfy their needs and keep satisfying them in the long run to create a loyal customers' segment. In this regard, this paper aims to investigate the impact of managing customers' relationship with the banks to achieve their loyalty (Mosallem, n.d.).

Business owners often concentrate on the improvement of their products and services, this is one of the basic features of the production concept. Often, they neglect their customer care and relationship; as a result, many of their customers move their purchasing decisions to organizations who can serve them better. The problem here is that they fail to understand that customers' value, care, and concern is far above the product quality. So, companies tend to try their best as much as possible to satisfy their customers and even attract more besides to strengthening loyalty (Long, Khalafinezhad & Wan Ismail, 2013).

Customer relationship management (CRM) refers to practices, strategies, technologies and a marketing tool that the banks in Palestine use to manage and analyze their customer's interactions and data throughout the customer lifecycle. The goal of improving the banks business relationships with customers is to assist in customer's retention and driving sales growth (Rouse, 2014).

Customer profitability systems can be the most powerful basis for a CRM implementation. Successful CRM programs increased customer loyalty. They have in plentiful instances even increased company revenues (Salawdeh, 2009). Banks in Palestine need to use effective CRM application, that enables them to easily gather critical sales and marketing information, not only pays for itself very quickly, it becomes a valuable resource for improving both the top revenue and the bottom profit lines.

Ranade (2012) shows that loyalty defined as a customer continuing to believe that the organization's product/service offer is his best option. It fulfills their value proposition whatever that may be. They take that offer whenever faced with that purchasing decision. Banks in Palestine competing in the local market to capture a better market share among this massive competition, the aim of these banks is to build a strong relationship with its customers for a better long-term loyalty with them.

The total number of the operated banks in Palestine is 15 banks, divided into local and foreign banks, foreign banks are the majority (8 foreign, 7 local). Around 7,000 employees working in these banks in Palestine (PMO, 2017). Banks in Palestine using CRM as a tool for managing the company's interactions with customers, users and all sales and financial issues. It uses technology to facilitate and manage the business processes and activities. Thus, CRM is an issue of strategic business and process rather than a technical one (Dowling, 2002).

The ultimate objective of this paper is to discover the impact of customer relationship management on long-term customers' loyalty in the Palestinian banking industry. And also, to highlight the most effective CRM dimensions that decision makers use to build and improve their CRM applications to help them in building a loyal relationship with customers. This study consisted of five parts, the introduction, the second part is the literature review which presents the theoretical and the empirical reviews for the previous studies about the study topic, methodology is the third part that contains data collection, validity, and reliability of questionnaire, conceptual model, the population and sample size, and the data analysis method used in this thesis. Whereas part four reflects the data analyses that are correspondent to the testing hypothesis and the results discussion, the last part is the scholars' conclusion.

2. Literature Review

The literature review in this study investigates the impact of customer relationship management on long-term customers' loyalty in the Palestinian banking industry. Literature review separated into two parts, theoretical and empirical literature reviews.

2.1 Theoretical Literature Review

Customer relationship management is a relatively new concept which emerged in the 1980s; with Saarijärvi et al. (2013b) noting that the early versions of CRM were referred to as database marketing and mainly consisted of interactions between customers and organizational staff. Stein et al. (2013) and Nguyen and Mutum (2012b) detail the rise of CRM as organizations started leveraging the benefits of collecting customer information in order to better satisfy their customers and enhance customer retention. Nguyen and Mutum (2012b) also note that during the 90s, more organizations considered customer service as a skill under continuous evolution that needed further investments. Goddard et al. (2012) claim that CRM has achieved the potential first seen in the 1980s, enabling organizations to enhance customer service by customizing their product and service offerings to specific customer segments and improving customer retention.

Customer relationship management has emerged as a crucial strategy for: (1) identification of profitable banking prospects and customers, while also (2) enabling banks to devote attention and time to enhancing account relationships with such clients via customized services, (3) discretionary decision-making, (4) re-pricing, and (5) marketing (Farquad et al., 2012; Vella et al., 2012; Awasthi & Sangle, 2013). Furthermore, Agariya and Singh (2012) add that CRM aids banks in differentiating customer segments according to profitability and business; as well as identifying associated risks with loan applicants, customers most likely to leave the bank, respond to offers, and default on their credit.

Despite the rapid growing CRM literature, the CRM dimensions and their effects on the customer outcomes need more studies for more results. Hollensen (2015) and Kumar and Reinartz (2012) identify two fundamental dimensions of CRM, which are (1) the human dimension and (2) the business dimension; in which the human dimension entails the recognition and response to the human needs of the customer, as well as the incorporation of gratitude and courtesy into customer service. In this case, acknowledging the concerns of the clients and defusing issues helps to enhance customer retention. Muther (2012) and Karjaluoto et al. (2014) expound further on five other dimensions which are service quality, customer's database, solving problems, employee behavior, and CRM system integration that entail the identification and satisfaction of business needs and the balancing of the organization's need for profitable operations and the customer's needs for quality service and products. In this paper, the scholars' focuses on five key CRM dimensions that other researchers found in many industries that these dimensions significantly enhance customers' loyalty, service quality, customer's database, solving customer's problems, employees' behavior and CRM system integration.

Customers' loyalty refers to an organization's success in creating and maintaining a long-term relationship with clients (Lawfer, 2014; Evanschitzky et al., 2012). In this case, one of the most important objectives of a business is to ensure that customers engage in continued, preferably profitable, business with the organization. Further, Burke (2015), and Sachs (2013) define Long-term Customer Loyalty as a relationship in which customers provide repeat business to one organization because of a certain feature in the latter's product or service despite having other options. Lowenstein (2014) provides the definition of Long-term Customers' Loyalty from the perspective of brands, stating that loyalty is the commitment by customers to repurchase a product or service and further advocate for the product through word of mouth. Martinez and Del Bosque (2013) also define of Long-term Customers' Loyalty from the perspective of repurchase behavior, but further, argue that it is the customer's high relative attitude to a specific organization or brand.

There are several dimensions of long-term customers' loyalty, including (1) effective and (2) logical commitment (Kitapci et al., 2013), (3) decreased loyalty to competitors (Lawfer, 2014; Burke, 2015; Martinez & Del Bosque, 2013), and (4) repurchase (Beneke et al., 2012; Sachs, 2013). Other dimensions of loyalty include (5) positive word of mouth (Lowenstein, 2014) and (6) purchase of other services or products from the organization (Evanschitzky et al., 2012).

2.2 Empirical Literature Review

In this section, the scholars' in this research will discuss the empirical reviews for CRM and long-term customer's loyalty.

Customer Relationship Management

Meadows and Dibb (2012), noting that the implementation of CRM can be problematic despite its widespread use in the management of client data, set out to investigate progress in the adoption of customer relationship management across different sectors in the services industry. The researchers used a CRM framework to explore the implementation progress of CRM with regard to the company, the staff, clients, and available CRM-enabling technology. The thesis determined several important variations in CRM implementation in different sectors, finding that CRM was particularly present in the banking sector.

Saarijärvi et al. (2013a) also set out to investigate the current status of customer relationships management in the service industry, in this case with regard to CRM's role in empowering customers and organizations. Noting the lack of adequate investigation of this issue in current literature, the researchers, however, argue for the need to shift CRM's focus towards the empowerment of clients and away from the over-focus on empowering the organization. Thus, this thesis shows that data collected through CRM should be used for the client' benefit specifically to deepen and lengthen the relationship.

Nguyen and Mutum (2012a), on the other hand, sought to characterize the advances, successes, pitfalls, and futures of customer relationships management. According to their findings, there is a significant risk that the customer's trust perceptions could be depleted if they perceive that the CRM offerings by the organization are merely exploiting the hem as customers. As a result, CRM should be implemented and practiced in a manner that benefits the customer as well as the organization by incorporating issues of trust, honesty, and fairness.

Long-term Customers' Loyalty

Due to the importance of customer loyalty to organizational performance and sustainability, there is a broad selection of literature about this concept and its relationship with various constructs of customer gratification and CRM. Pan et al. (2012) conducted an empirical investigation on the antecedents and predictors of customer loyalty and hypothesized that trust, which is a potential outcome of customer satisfaction, had a stronger effect size as a determinant of long-term loyalty. The findings show that product performance in terms of quality and gratification had a smaller effect size on Long-term Customers' Loyalty compared to trust and relationship quality.

Amin et al. (2012) examined the factors that contribute to customer loyalty in the service industry by administering a questionnaire survey to university students. From the findings, a positive relationship emerged between customer loyalty on one side and perceived service quality, corporate image, trust, and switching cost on the other. The results also implied that service quality perceptions by the customer entailed the most significant determinant of customer loyalty, particularly in long-term relationships.

Hassan et al. (2012) empirically measured customer loyalty among clients of Islamic banking, with the aim of determining their long-term commitment. Using data from questionnaire surveys administered to 125 customers from 20 Islamic banking financial institutions, the authors found that switching costs, customer satisfaction, customer perception, trust, and success philosophy had the significant influence on Islamic banking-customer loyalty. These findings indicate that financial institutions offering Islamic banking services should improve service quality, as well as create more awareness about the quality of these services, to enhance the loyalty of their customers.

3. Hypotheses

The First Null Hypothesis: There is no significant relationship between CRM and Long-term Customers' Loyalty in the Palestinian Banking Industry.

The First Alternative Hypothesis: There is a significant relationship between CRM and Long-term Customers' Loyalty in the Palestinian Banking Industry.

The Second Null Hypothesis: There is no significant impact of CRM dimensions on Long-term Customers' Loyalty in the Palestinian Banking Industry.

The Second Alternative Hypothesis: There is a significant impact of CRM dimensions on Long-term Customers' Loyalty in the Palestinian Banking Industry**.**

4. Methodology

4.1 Data Collection and Reliability

The scholars' used the primary data in this paper. The survey questionnaire is used to gather data from bankers in the operated banks in Palestine. This questionnaire consisted of three sections, section one is CRM which is developed by Hashem et al (2012), in this section it has five sub-sections, 1) service quality is structured into 13 items, 2) customer's database has 7 items, 3) employee's behavior 6 items, 4) solving customer's problem 12 items and 5) CRM system integration has 7 items. Section 2 is long-term customers' loyalty developed by Harsandaldeep Kaur and Harmeen Soch (2012) which has 11 items and the last part consisted of general and demographic information about the respondents which has seven variables, the overall items in the first three sections is 56. It is a five Likert scale questionnaire except for the third section from 5= Strongly Agree, 1= Strongly Disagree.

Reliability in this paper is calculated by using Cronbach's Alpha equations. It was (0.951) for the first dimension (CRM), (0.842) for the second dimension (Long-term Customer's Loyalty), in and the total of the questionnaire effectiveness was (0.897).

4.2 Population and Sample size

Banks in Palestine employ more than 7,000 persons. The population of this paper is limited to the employees of the local and foreign banks in North West Bank (around 1,960 employees). The scholars' used Krejcie and Morgan (1970) equation to determine the sample size, so the minimum number of sample size is 322 bankers in the operated banks in Palestine. The scholars' used a simple random sample that is suitable for the study objectives.

4.3 Conceptual Model

The overall objective of this paper is to find out the impact of CRM dimensions on long-term customers' loyalty in the Palestinian Banking Industry. Banks must improve its relationship with customers which help them to deliver services and products beyond customer expectations in order to retain their existing customers (Winer, 2001). The conceptual framework for this paper is developed on this framework which is the effective CRM dimensions is a key ingredient for long-term customers' loyalty. Table 1 shows the study variables and its related indicators. Therefore, the scholars' in this paper set the conceptual framework to guide this study as the follows in figure 1.

Table 1. Study Variables and its related indicators

Variables	Type	Related indicators
CRM (Customer Relationship Management)	Independent	Solving problems
		Customers DB
		Service quality
		Employee behavior
		CRM system integration
Long-term customers' loyalty	Dependent	--------------------

Source: Researchers

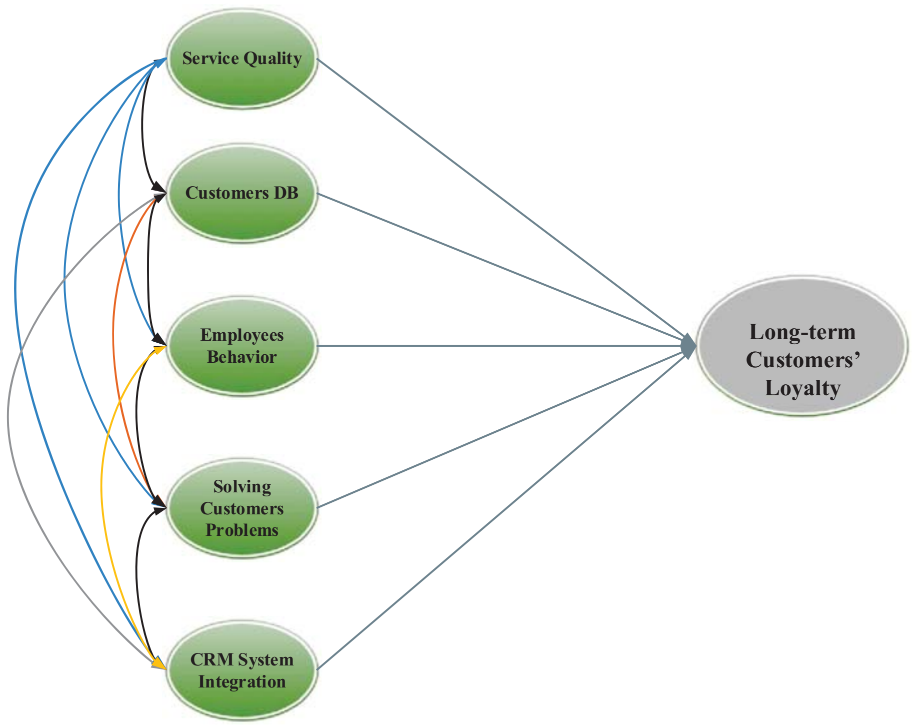

Figure 1. Conceptual Model

5. Data Analysis

5.1 Testing Hypotheses

The data were analyzed by using the statistical package for Social Sciences (SPSS) version 23. The data were checked for entry errors. The relationship between variables was analyzed by the using Pearson correlation, multilinear regression to test the significant impact of CRM dimensions on long-term customers loyalty.

H0-1: There is no significant relationship between CRM and Long-term Customers' Loyalty in the Palestinian Banking Industry

Ha-1: There is a significant relationship between CRM and Long-term Customers' Loyalty in the Palestinian Banking Industry

Table 2. Correlation coefficients among CRM and Long-term Customers' Loyalty variables

Dimensions	1	2	3	4	5	6	7
Service Quality	**1**						
Customers Database	**.683******	**1**					
Employees Behavior	**.520******	**.541******	**1**				
Solving Customers Problems	**.725******	**.622******	**.625******	**1**			
CRM System Integration	**.481******	**.539******	**.358******	**.649******	**1**		
CRM	**.873******	**.819******	**.734******	**.901******	**.723******	**1**	
Long-term Customers' Loyalty	**.327******	**.292******	**.253******	**.415******	**.577******	**.451******	**1**

**. Correlation is significant at the 0.01 level

Source: Researcher

The size of the value of the correlation coefficient was decided, for indicating the relationship strength between two variables. According to Cohen's standard (1962), the guidelines for assessing the relationship are showing in Table 3.

Table 3. The guidelines for assessing the relationship

Strength	Value
Small	0.10 to 0.29
Medium	0.30 to 0.49
Large	0.50 to 1.0

Source: (Cohen, 1988)

As shown in table 2, the relationships between all independent and dependent variables are seen positive. Here the scholars' can see that, 1) In Palestine banking industry, Service Quality significantly related to CRM. Although the Solving Customers Problems could offer more attractive terms, the consumers in Palestine do not tend to switch their banks; 2) CRM System Integration is a better predictor than Employees Behavior of Long-term Customers' Loyalty, as its higher correlation of 0.577 than 0.292.

Based on the scale in the above table 3, the scholars' can conclude from Table 2 that: Service Quality hasn't the strongest relationship with the formation of Long-term Customers' Loyalty, less than the role of CRM System Integration; oppositely, the Employees Behavior has minor impact on the loyalty, less than the influence of Service Quality.

H0-2: There is no significant impact of CRM dimensions on Long-term Customers' Loyalty in the Palestinian Banking Industry

Ha-2: There is a significant impact of CRM dimensions on Long-term Customers' Loyalty in the Palestinian Banking Industry

Table 4. R-square and ANOVA for econometrics model

Model	Sum of Squares	df	Mean Square	F	Sig.	R	R Square	Adjusted R Square
Regression	14.506	5	2.901	26.020	.000[b]			
Residual	15.610	223	.111			.694[a]	.482	.463
Total	30.115	228						

a. Dependent Variable: Long-term Customers Loyalty

Source: Researchers

The scholars' results from table 4, using ANOVA, it also shows a significant value of 26.02 for the F distribution with 5 and 223 df. The F-test can be taken as a measure of overall model significance of the estimated regression, indicates that the p-value is less than 0.05, which implies that a significant relationship exists between the selected variables in this model in other words "Indicates that the combination of these variables significantly predicts the dependent variable", also as R^2= 0.482 which means the independents variables explain 48.2% from the variation of dependent variable "long-term customers' loyalty", also Multiple correlation coefficients "r=0.694" shows positive and strong linear relationship between dependent variable "Long-term Customers Loyalty" and the predictors.

Table 5. The OLS summary statistics of the null hypothesis

Model	Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
(Constant)	-.246	.543		-.454	.650
Service Quality	.048	.071	.042	.680	.497
Customers Database	.075	.119	.058	.635	.526
Employees Behavior	.274	.105	.251	2.610	.010
Solving Customers Problems	.006	.122	.005	.053	.958
CRM System Integration	.618	.058	.650	10.618	.000

Source: Researchers

Multiple regression analysis was used to test if CRM dimensions significantly predicted Long-term Customers' Loyalty. The results of the regression indicated the two predictors (Employees Behavior and CRM System Integration) explained 48.2% of the variance (R^2= 0.482, F (5,223) =26.02, P< 0.05). It was found that Employees Behavior significantly predicted Long-term Customer Loyalty (ß=.274=, p=0.01), as did CRM System Integration (ß=.618=, p=0.000).

The econometric model equation:

Long-term Customers' loyalty = 0.274 Employee's Behavior+ 0.618 CRM System Integration.

The interpretations of the significant independent variables:

- There is a direct impact on employee's behavior and long-term customers' loyalty, and an increasing employee's behavior by 10 units may increase the long-term customers' loyalty by 2.74 units.
- There is a direct impact on CRM system integrations and long-term customers' loyalty, and increasing CRM system integrations by 10 units may increase the long-term customers' loyalty by 6.18 units.
- But there is no impact that means no impact for these predictor variables (service quality, customers' database, solving customer's problems) on the long-term customers' loyalty.

5.2 Discussion

The First Hypothesis contended that there is a positive relationship between CRM and Long-term customers' loyalty in the Palestinian banking industry. The scholars' concluded that service quality in-Palestine banking industry plays a significant role in CRM. Solving customer's problems is a significant term which is an indicator for the banks that their customers will not switch to other banks. They also concluded that service quality hasn't the strongest relationship with the formation of long-term customers' loyalty, oppositely, the employee's behavior has a minor relationship with loyalty, less than the influence of service quality.

According to the results, there is a significant impact exists between the selected variables in this model in other words "Indicates that the combination of these variables significantly predicts the dependent variable", $R^2= 0.482$ which means the independents variables explain 48.2% from the variation of dependent variable "long-term customers' loyalty", "$r=0.694$" shows a positive and strong linear relationship between dependent variable "long-term customers' loyalty" and the predictors (CRM dimensions).

The scholars' results show that only "Employees Behavior" and "CRM System Integration" are significantly contributing in the regression equation. Long et al. (2013) also investigated the influence of various factors of customer relationship management on customers' loyalty. The elements of customer relationship management identified in their thesis were interaction management, customer service quality, employee behavior, and relationship development. From the findings, the scholars' concluded that employee's behavior was the most important construct of customer relationship management in the service industry, and that employee behavior had a significant correlation to customers' loyalty. Employees behavior according to the scholars' point of view will affect the other CRM dimensions, the behavior will affect the other four dimensions and how employees interact with them, if customers were happy to deal with employees, then employees will extract the right information about them that will enrich the customer's database which will be used to enhance the CRM system integration to provide better services that meet their needs, once banks achieve this milestone they will achieve the goal to gain more loyalty from customers.

6. Conclusion and Recommendations

The results of this paper showed positive and strong linear relationship between dependent variable "long-term customers' loyalty" and the CRM dimensions, CRM system integration is positively direct effect on long-term customers' loyalty. The paper also determined that there is a direct impact on employee's behavior and long-term customers' loyalty.

The scholars' noted from the results of this paper that bankers need to investigate why male employees more effective in service quality than females in their banks, is that related to that male employees have more attention and training than female employees? .In addition, Scholars' recommended that local banks need to improve their capabilities to enhance the level of service quality and employee's behavior and to update their customer's database with the recent technologies, in order to serve and provide customers with required services through gathering the accurate information about them by building a strong relationship between the banks and customers.

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Training and Performance: A Sign from Saudi Service Organizations

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Abstract

The aim of this study is to explore the effect of training on organizational performance. Training techniques were categorized into two types: behavioural training techniques (on-the-job training) and cognitive training techniques (off-the-job training). Three behavioural techniques were selected – monitoring, coaching, and job rotation – and three cognitive techniques – role playing, lectures, and computer-based training. Training as an independent construct was measured based on these behavioural and cognitive techniques. On the other hand, organizational performance was measured based on subjective items related to the operational dimensions of organizations' performance. A questionnaire-based survey was used to collect data from a sample consisting of 600 employees working at service organizations in Saudi Arabia. Of the questionnaires distributed to the sample, 478 were returned complete and valid for the analysis process. The Statistical Package of Social Sciences (SPSS) version 20 was used to analyse the collected data. The findings of the study confirmed that both behavioural techniques of training were significantly and positively related to organizational performance. In fact, the results identified job rotation as a main practice of on-the-job training techniques that lead to improved organizational performance. There is a statistically significant influence of other dimensions, such as coaching, monitoring, role playing, lectures, and computer-based training, on organizational performance. Despite the positive and direct impact of on-the-job training and off-the-job training on the dependent variable, organizational performance, on-the-job training has a larger impact on this construct. The results are presented and discussed, and recommendations, limitations, and future research directions are provided.

Keywords: training, on-the-job training, off-the-job training, organizational performance.

1. Introduction

Organizations face many challenges, including increased competition under globalization. Therefore, organizations are required to consider human resource management practices in general and training in particular. Training has been defined as providing employees with knowledge, skills, and abilities that enable them to carry out organizational activities efficiently and effectively (Hanaysha, 2016). As a result, training improves organizational performance (Khan et al., 2011). In terms of the importance of training, some studies have shown that this concept plays an important role in improving the efficiency and effectiveness of staff in particular and the organization as a whole. The reason for the role of training in improving staff performance is that training increases the knowledge, skills, and abilities of the employees. Ultimately, improved staff performance improves the performance of the organization (Khan et al., 2011).

The relationship between training and performance remains controversial among researchers. Some studies have confirmed the direct impact of training on performance, while others have pointed out that training has no significant relationship with performance (Aragon et al., 2014). In contrast, numerous studies have found that training significantly and positively affects organizational performance (Sherwani & Mohammed, 2015). Of the respondents who participated in Kum et al.'s (2014) study, about 70 per cent agreed that training programmes enhanced their performance. In the context of public universities, Talpur et al. (2016) found a significant as well as positive effect of training on organizational performance. Elnaga and Imran (2013) confirmed that training has a positive impact on employee performance. Shaheen et al. (2013) studied the mediating role of employee performance in the relationship between employees' training and organizational performance. Their results revealed a positive relation between these two constructs. Based on their results obtained from examining the relationship between the training and the organizational performance of five telecom companies, Sultana et al.

(2012) regarded training as a vital element in the process of organizational performance enhancement.

The present study aims to verify the impact of training on organizational performance using a sample of companies operating in the service sector. The main contribution of the current study stems from the identification of the actual role of training in improving organizational performance in the business environment of Saudi companies. Some studies have confirmed that solving organizational performance problems does not depend solely on training. Sometimes training does not improve performance, because the staff members in fact do not need training (Milhem et al., 2014). Therefore, the present study aims to investigate the actual relationship between training and performance, especially since training is a costly process. The study comprises two independent variables, which are on-the-job training, measured by monitoring, coaching, and job rotation, and off-the-job training, evaluated by role playing, lectures, and computer-based training. The study includes one dependent variable, which is organizational performance.

2. Literature Review and Hypothesis Development

There is almost a consensus among researchers that the aim of training employees is to provide them with skills, knowledge, and capabilities that can be used for the implementation of work activities as well as to provide opportunities for their development (Hanaysha, 2016). The definitions provided in Sherwani and Mohammed's (2015) study confirmed that training, as a human resource management practice, is a good way to improve employees' knowledge, skills, and development opportunities. Citing Nel et al. (2004), Kum et al. (2014) argued that training results in a significant change in employees' behaviour, reduces defects and failures of projects, and increases the abilities of the employees to progress and perform more projects. Khan et al. (2017) and Talpur et al. (2016) added that employee training and development programmes lead to enhanced job performance. Goldstein and Ford (2002, cited in Aguinis & Kraiger, 2009) defined training as a systematic learning and development approach used to enhance the effectiveness of individuals, groups, and organizations as a whole.

In fact, studying the relationship between training methods and organizational performance is very important, since the confirmation of the hypotheses helps organizations to acquire one of the most effective tools required to survive, gain a competitive advantage, enhance the quality of work life, and improve the capabilities of their employees (Kulkarni, 2013). Kulkarni divided training types into two types, on-the-job training and off-the-job training, and reported some examples of on-the-job training methods – step-by-step training, job rotation, job instructions, committee assignment, coaching, and internship training – and off-the-job training methods – role playing, workshops, lectures, case studies, conferences, computer modelling, and experiential as well as stimulation exercises.

In the same context, Falola et al. (2014) classified training into two main types: behavioural and cognitive training. According to them, behavioural training refers to on-the-job training, while cognitive training refers to off-the-job training. Malaolu and Ogbuabor (2013) defined on-the-job training as a training technique used to equip employees with specific skills while they are on the job. They defined off-the-job training as a training technique provided in educational institutions, which lasts for a specified period. For the current study, three behavioural techniques of on-the-job training were selected, which were monitoring, coaching and job rotation, and three cognitive techniques of off-the-job training, which were role playing, lectures, and computer-based training (Falola et al., 2014; Kulkarni, 2013; Malaolu & Ogbuabor, 2013).

Concerning the relationship between training and performance, mixed results were drawn from previous studies. Numerous studies have stressed the importance of the role of training in improving organizational performance. Vinesh (2014) regarded training as a significant tool that results in enhanced employee performance and satisfaction and increased productivity and equality of goods and services, in addition to decreased efforts of supervision and costs.

Sherwani and Mohammed (2015) found a positive effect of training programme success on employees' outcomes, such as productivity, capability to solve work-related problems, and performance. Percival et al. (2013) highlighted the significance of investment in training to maintain employees' productivity. Using a sample consisting of employees working in banks in Nigeria, Umar et al. (2013) used five variables to measure training and development in those banks, which were the organization's commitment to the training and development of employees, types of training employed, frequency of training, performance-based rewards provided during training sessions, and modern training facilities. Their results accepted the hypotheses that organizational commitment, frequency of training, and performance-based rewards have a significant impact on organizational performance. On the other hand, the types of training and modern training facilities have no significant effects on organizational performance. One study conducted in the banking sector in India by Bhat (2013) found a positive influence of training on employee performance.

Using a sample of the employees working at a Lebanese industrial company, Tangoukian et al. (2016) conducted a study to examine the advantages and pitfalls of training and found that most of the departments in the company implement both internal and external training practices, despite the fact that employees prefer external training to internal training. In their review of research, the effect of training on organizational outcomes, such as human resource outcomes, performance outcomes, financial outcomes, and stock outcomes, Tharenou et al. (2007) found that the strongest correlation was between training and organizational outcomes, such as organizational performance. Saks and Burke-Smalley (2014) questioned the relationship between training transfer and organizational performance using a sample of training participants in a training institution in Canada. Interestingly, their findings suggested that on-the-job training has the strongest relationship with both training transfer and organizational performance. The results of Falola et al.'s (2014) study confirmed that both behavioural and cognitive aspects of training result in increased performance. It should be noted here that some studies have dealt with training in terms of strategies, policies, or types rather than as a general construct. For example, Khan et al. (2011) studied the relationship between training and performance by focusing on workplace training or so-called on-the-job training, training style, and training design. In terms of the relationship between on-the-job training and organizational performance, the study showed a significant effect of on-the-job training on performance. Table 1 includes examples of the results of some previous studies.

Table 1. Impact of training methods or types on organizational performance in the literature

Authors	Positive impact	Negative impact
Tharenou et al. (2007)	✓	-
Khan et al. (2011)	✓	-
Bhat (2013)	✓	-
Percival et al. (2013)	✓	-
Umar et al. (2013)	✓	-
Elnaga and Imran (2013)	✓	-
Umar et al. (2013)	-	✓
Aragon et al. (2014)	-	✓
Saks and Burke-Smalley (2014)	✓	-
Sherwani and Mohammed (2015)	✓	-
Hanaysha (2016)	✓	-
Talpur et al. (2016)	✓	-
Khan et al. (2017)	✓	-

On the basis of the above-mentioned literature and following previous works, such as Falola et al. (2014), Khan et al. (2011), Kulkarni (2013), Malaolu and Ogbuabor (2013), and Saks and Burke-Smalley (2014), the current study classified training into two types: on-the-job training (monitoring, coaching, and job rotation) and off-the-job training (role playing, classroom lectures, and computer-based training). Consequently, two hypotheses were suggested:_

H_1: On-the-job training techniques are positively and significantly related to organizational performance.

H_2: Off-the-job training techniques are positively and significantly related to organizational performance.

3. Methodology

3.1 The Conceptual Model of the Study

Figure 1 displays the conceptual model of the study. The figure shows two independent variables – on-the-job training and off-the-job training – and one dependent variable – organizational performance.

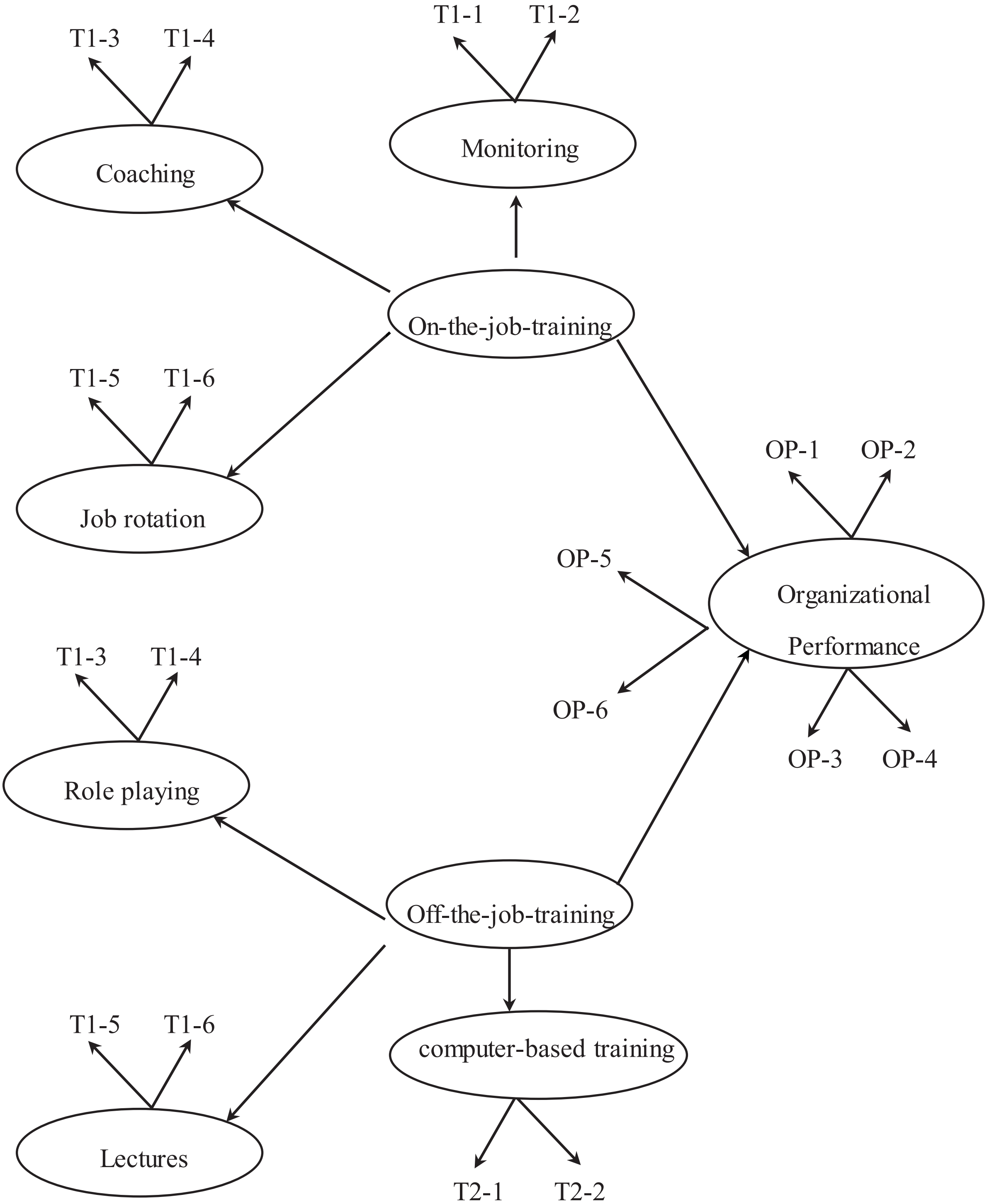

Figure 1. The conceptual model

3.2 The Sample of the Study and Data Collection

The sample of the current study consisted of 600 employees of service organizations in the capital city, Riyadh. A questionnaire designed on the basis of Likert five-point scales (1: strongly disagree, 5: strongly agree) was used to collect the required data from the sample members. It was composed of three measures adopted to evaluate the study constructs: on-the-job training, off-the-job training, and organizational performance. The questionnaire was distributed via e-mail to the employees. A total of 478 questionnaires were returned complete and valid for the statistical analysis.

3.3 Measures

Training dimensions comprised two techniques of training, behavioural and cognitive techniques. The behavioural techniques were measured using the three sub-dimensions of monitoring, coaching, and job rotation, while the cognitive techniques were assessed using the three sub-dimensions of role playing, lectures, and computer-based training. Twelve items were adopted from previous studies (Falola et al., 2014; Malaolu & Ogbuabor, 2013) to measure training techniques, with six items for each dimension. An example of an on-the-job training item is "my company deems monitoring as a basic part of the on-the-job training adopted". Organizational performance was measured using six items concerning the quality of service provided, development of new services, and increased market share (Shaheen et al., 2013). One of the items used to measure OP was "my company achieved an increased market share from 2014 to 2016". Table 2 shows the components of the questionnaire used in this study.

Table 2. The components of the questionnaire used in the current study

Variables	Dimensions	Sub-dimensions	No. of items
		Monitoring	2
Behavioral techniques	On-the-job-training	Coaching	2
		Job rotation	2
		Role playing	2
Cognitive techniques	Off-the-job-training	Lectures	2
		Computer-based training	2
	Quality of service	-	2
OP	New services	-	2
	Market share	-	2

4. Results

Means and standard deviations (SDs) were calculated for all the items included in the questionnaire. The results shown in Table 3 indicated that the mean values of items were above 3.60. Moreover, the results of factor loadings in the same table pointed out strong loadings of all the items consistent with the suggested threshold point 0.6 (Talpur et al., 2016). The table also shows the results of the average variance explained (AVE), Cronbach's alpha, and composite reliability. It was concluded that the AVE values for the study constructs were above 0.5 (0.785, 0.847, and 0.794) and the Cronbach's alpha values ranged from 0.77 to 0.81 (all the values were above 0.7).

Table 3. Results of means, SDs, AVE, loadings, Cronbach's alpha, and composite reliability

Constructs	Items	Mean	SD	Loading	AVE	α	CR
	T1-1	4.29	1.03	0.671			
	T1-2	3.84	1.21	0.711			
	T1-3	3.86	0.98	0.821			
On-the-job-training	T1-4	4.54	0.79	0.742	0.785	0.779	0.855
	T1-5	4.12	1.00	0.799			
	T1-6	4.00	0.98	0.880			
	Total	4.11	0.88	-			
	T2-1	3.71	0.87	0.771			
	T2-2	3.89	0.77	0.840			
	T2-3	3.76	0.69	0.800			
Off-the-job-training	T2-4	4.16	0.86	0.753	0.847	0.844	0.793
	T2-5	2.78	1.04	0.951			
	T2-6	1.99	0.90	0.886			
	Total	3.38	0.73	-			
	OP-1	4.55	1.12	0.759			
	OP-2	3.88	0.59	0.957			
	OP-3	4.78	0.82	0.695			
OP	OP-4	4.91	0.74	0.751	0.794	0.867	0.801
	OP-5	3.99	0.79	0.863			
	OP-6	3.87	0.88	0.831			
	Total	4.33	0.971	-			

According to Paat and Rumokoy (2015), values of Cronbach's alpha equal to 0.7 indicate acceptable data reliability, while values more than 0.7 represent an indicator of good reliability. The composite reliability (CR) values of the study variables, which ranged from 0.877 to 0.911, are considered to be acceptable, since all the values were above 0.7. It has been proved that the total mean value of on-the-job training dimensions (M = 4.11, SD = 0.88) is greater than the total mean value of the off-the-job training dimensions (M = 3.38, SD = 0.73).

4.1 Correlation Analysis

Pearson coefficients for training techniques as well as organizational performance were calculated to investigate the degree of correlation between each pair of these variables. The results displayed in Table 4 point out positive correlations between on-the-job training and off-the-job training ($r = 0.381$, $P < 0.05$), between on-the-job training and organizational performance ($r = 0.401$, $P < 0.05$), and between off-the-job training and organizational performance ($r = 0.377$, $P < 0.05$).

Table 4. Pearson's correlation matrix

Variables	T1	T2	OP
T1	-		
T2	0.381*	-	
OP	0.401*	0.377*	-

T1: on-the-job training, T2: off-the-job training, OP: organizational performance

* Correlation is significant at the 0.05 level (2-tailed).

4.2 Structural Equation Modelling (SEM)

The main aim of the structural model is to explore the degree to which the hypothesized model of the study is fit (Al-Harthy, 2017). For the current study, it was hypothesized that on-the-job training and off-the-job training have an impact on organizational performance. The findings of the SE model related to the fit indices shown in Table 5 confirmed the acceptable values of these indices.

Table 5. The results of SEM

Index	Value	Result	Interpretation	Reference
χ^2	2.63	Accepted	< 3	Hair et al. (1998)
GFI	0.97	Accepted	> 0.95	Engel and Moosbrugger (2003)
RMSEA	0.043	Accepted	≤ 0.09	Iacobucci (2010)

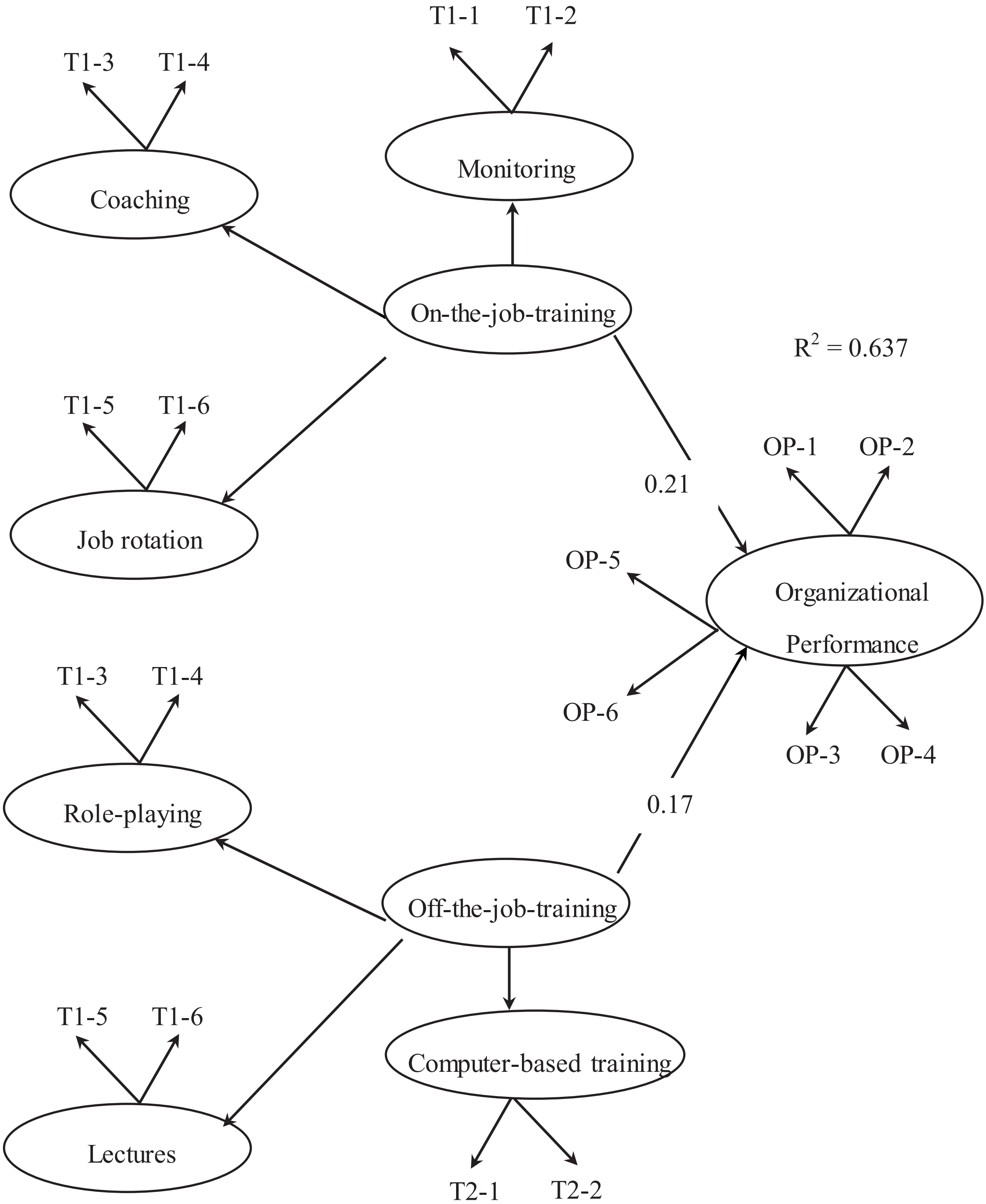

Figure 1. The conceptual model

The results of the data collected from the members of the study sample supported the hypotheses of the study. It was concluded that on-the-job training and off-the-job training are both related to OP (β = 0.21, P = 0.003 and β = 0.17, P = 0.010, respectively). However, the most valuable influence on OP was from the on-job training technique. Table 6 shows a summary of the results.

Table 6. A summary of the study results

No.	Suggested path			β	P	Result
H_1	On-the-job training techniques	$\Rightarrow$	OP	0.21	0.003	Accepted
H_2	Off-the-job training techniques	$\Rightarrow$	OP	0.17	0.010	Accepted

5. Discussion and Conclusion

The aim of the current study was to investigate the impact of training techniques on the organizational performance of organizations working in the service sector. Training techniques were categorized into two types: behavioural-based techniques (monitoring, coaching, and job rotation) and cognitive-based techniques (role-playing, lectures, and computer-based training). The results confirmed that both techniques of training investigated in the current study are significantly and positively related to the organizational performance of service organizations. Job rotation was the most significant variable with the strongest effect on organizational performance, followed by coaching and monitoring. On the other hand, role playing, as one of the cognitive training techniques, was the most important variable in terms of its influence on organizational performance, followed by computer-based training. Interestingly, lectures, as one practice of off-the-job-training, had no significant impact on the organizational performance. The results of the current study echo those of numerous previous studies, such as Paat and Rumokoy (2015). According to them, this type of training is considered to be a specific teaching technique within the organizational policy and related to the knowledge and skills required to perform specific jobs. Tharenou et al. (2007) conducted a review of research on training and organizational outcomes, such as (1) human resource outcomes, namely employee turnover, a low level of absenteeism, high job performance, and motivation; (2) organizational performance outcomes, specifically quality, service, and productivity; (3) financial outcomes, that is, return on investment, return on assets, and profit; and (4) stock market outcomes, namely stock value and shareholder value. Their results indicated that the effect of training on organizational performance and human resource outcomes is greater than the effect of training on financial outcomes. Despite the positive effect of training on organizational performance, it is in fact a small effect. The authors explained this as being due to other factors that have an influence on organizational performance. Similar results revealed by previous studies that match the same constructs of training used in the current study are very scarce. Most studies that have investigated the relationship between training and organizational performance have conceptualized training as a whole construct. For the current study, training was categorized into two techniques: on-the-job training and off-the-job training. Each of these constructs was divided into three sub-categories. The conceptualization of training in this way in the present study represents its main contribution. In general, the results obtained by the study were similar to the results of many other studies in the same context, which pointed out a significant as well as positive influence of training on organizational performance (Elnaga & Imran, 2013; Falola et al., 2014; Khan et al., 2011, 2017; Kum et al., 2014; Percival et al., 2013; Saks & Burke-Smalley, 2014; Shaheen et al., 2013; Sherwani & Mohammed, 2015; Sultana et al., 2012; Talpur et al., 2016; Tangoukian et al., 2016; Umar et al., 2013).

6. Recommendations, Limitations, and Future Research

On the basis of the above-mentioned findings, organizations are required to pay more attention to training techniques. In fact, the findings of the study revealed that both techniques examined in the study (on-the-job training and off-the-job training) have a significant impact on organizational performance. However, the effect of on-the-job training techniques on organizational performance is greater than the effect of off-the-job training techniques. Therefore, more attention should be paid to training techniques such as monitoring, coaching, and, particularly, job rotation.

On the other hand, researchers are required to study the influence of different variables related to training on organizational performance using samples from different sectors. It is worth mentioning here that the relationship between training practices and organizational performance is restricted to other variables that mediate the relationship between these two variables, such as employees' job involvement (Sultana et al., 2012).

The findings of the present study are limited to organizations operating in the service industry. Concerning the variables studied in this study, training was assessed using two techniques: behavioural and cognitive techniques. Other dimensions of training facilities should be considered in new studies, such as organizations' commitment to the training and development of employees, the frequency of training, and performance-based rewards provided during training sessions. The organizational performance was measured using factors related to the operational dimensions of performance; hence, additional dimensions related to the financial aspects of organizational performance are required to ensure a comprehensive as well as an effective measurement of this variable. Therefore, further studies are needed to explore the relationship between training and performance using a larger sample of organizations and organizations from other sectors.

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Small Firms, Corruption, and Demand for Credit. Evidence from the Euro Area[1]

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Abstract

In this paper, we aim to assess how the quality of the institutional environment – identified according to the level of corruption perceived in a country – may affect the access to credit for micro, small, and medium-sized enterprises (MSMEs). Based on a sample of 68,115 observations – drawn from the ECB-SAFE survey – related to MSMEs chartered in 11 euro area countries, we investigate whether the level of corruption affects their demand for bank loans during the period 2009–2014.

Overall, we find that the degree of corruption seems to play a role in the applications for bank loans when small firms are under investigation. Interestingly, results highlight that small businesses chartered in highly corrupt countries face a greater probability of self-restraint regarding their loan applications (about 7.4%) than small firms located in low-corruption economies (around 6%). The results are robust to various model specifications and econometric methodologies. Our findings suggest that anti-corruption policies and measures enhancing transparency in the economy may be crucial in reducing the negative spillovers generated by a low-quality institutional environment on the access to credit by small firms.

Keywords: credit access, bank loans, MSMEs, corruption

JEL Classification: G20, G21, G30, G32, D73

1. Introduction

Bank credit is a crucial financing tool for the development of micro, small, and medium-sized enterprises (MSMEs), given their difficulties in easily entering the equity markets (Ayadi and Gadi 2013; Kremp and Sevestre 2013; Vermoesen, Deloof, and Laveren 2013). However, the access to bank credit is not as easy as one might think. Specifically, MSMEs often come into trouble when they have to provide good collateral for the loan officers (Cowan, Drexler, and Yañez 2015; Öztürk and Mrkaic 2014; Vos et al. 2007). Additionally, in times of crisis – like the one that recently occurred in Europe – liquidity shortages and credit restrictions have further weakened the access to bank loans for MSMEs (Popov and Van Horen 2015; Popov and Udell 2012). This is not inconsequential, given that MSMEs are important drivers of the European economy. Indeed, they represent 99% of nonfinancial firms in the European Union (EU), provide jobs for more than 91 million people (67% of

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employment in the EU), and generate about 60% of the total added value of the entire Union (EIF, 2016).

Apart from the firm financial features and the economic context in which they operate, the quality of the institutional environment may play an important role in affecting the credit market in many regards.

While a vast branch of the empirical literature has shown that the efficiency of institutions, the enforcement of legal rights – i.e., creditor rights protection and judicial enforcement (La Porta et al. 1997; Qian and Strahan 2007; Djankov et al. 2008; Moro, Maresch, and Ferrando 2016; Galli, Mascia, and Rossi 2017) – and the competitiveness of the bank market (Cavalluzzo, Cavalluzzo, and Wolken 2002) play a role in the credit market, thereby affecting MSMEs' loan applications, scarce attention has been devoted in literature to the relation between corruption and firms financing. This is particularly unfortunate given that corruption is considered one of the major obstacles to economic growth.[2]

To the best of our knowledge, the literature still lacks of empirical contributions regarding the effect that corruption has on the access to bank credit by MSMEs. To fill this gap, the present study aims at assessing how the level of corruption may affect the MSMEs access to bank credit. Specifically we assume that corruption will modify the firms' expectations about their bank financing and the level of trust required in the bank-firm relationship. Consequently, the hypothesis under investigation is the following:

H_1: *In a more corrupt institutional context, MSMEs face a higher probability to self-refrain from applying to bank loan anticipating more difficulties in the bank-firm relationship, than larger firms.*

To test our hypothesis we employ two different specifications. First we estimate the probability to self-refrain for MSMEs, compared to larger firms, by controlling for alternative measures of corruption, as well as for a large set of firm-level characteristics and macro firm-invariant indicators. Second, we consider only the discouraged borrowers (i.e., those that do not apply to bank loan for fear of rejection), and we study the relationship between corruption and MSMEs by interacting the variable "small" firms with corruption measures. Finally, to corroborate our results and to control for the selection bias we propose several econometric strategies (multinomial logit, logit and Heckman models).

Our empirical analysis is based on a sample of 68,115 observations – drawn from the ECB Survey on the Access to Finance of Enterprises (SAFE) – related to MSMEs chartered in 11 euro area countries during the period 2009–2014 (i.e., from the first to the twelfth wave of the survey).

Our results, robust to different specifications and empirical techniques, show that the quality of the institutional environment, proxied by the level of corruption, matters in affecting the micro and small firms' applications for bank loans.

The rest of paper is organized as follows. In Section 2, we briefly report the related literature. Section 3 illustrates the data and the methodology. In Section 4, we discuss the steps of our empirical strategy and comment on the results. Section 5 draws some conclusions.

2. Related Literature

Corruption, defined as the abuse by a public officer of his/her power to obtain a private gain (Rose-Ackerman 1975), is a complex and severe phenomenon that is differently spread in industrialized, emerging and developing countries. Most of the economic literature and institutional reports consider corruption as a major obstacle to social development and economic growth – namely, the so-called hypothesis of "sand in the wheels" (see, among others, Myrdal 1989; Andvig and Moene 1990; Shleifer and Vishny 1993; Mauro 1995; Keefer and Knack 1997; Hall and Jones 1999; La Porta et al. 1999; Li, Xu, and Zou 2000; Gyimah-Brempong 2002; Tanzi and Davoodi 2002; Kaufmann 2005; Blackburn and Sarmah 2008; World Bank 2007; World Bank various years).[3] According to this hypothesis, corruption acts as a barrier to competition, reduces the incentives to invest both domestically and from abroad, misallocates public resources negatively affecting the efficiency of public investments (Mauro 1998; Tanzi and Davoodi 1998; Gupta et al. 2001), and lowers the level of trust in the institutions (Hunt 2005; Hunt and Laszlo 2005). As a consequence, corruption generates harmful effects on both the social development and the economic growth of a country.

[2]For a recent survey, see Dimant and Tosato (2017).

[3]On the contrary, another strand of literature develops the so-called "grease the wheels" hypothesis arguing that corruption represents the market response to the inefficiencies of the public sector. This literature empirically predicts a non-linear relation between corruption and economic growth at low levels of corruption incidence (see, among others, Lui 1985; Klitgaard 1988; Acemoglu and Verdier 1998; Shleifer and Vishny 1993).

Most importantly to our purpose, corruption negatively affects the business environment, diminishing the level of horizontal and vertical trust and producing uncertainty. Some papers (e.g., Bhagwati 1982; Campos, Estrin, and Proto 2010; Svensson 2003) have emphasized that in a highly corrupt environment, bribes represent a barrier to entry especially for MSMEs, because the scarcity of their financial resources, the lower bargaining power, and the difficulty in accessing bank credit make it very difficult for them to refuse the payment of bribes. In other words, the burden per output is obviously greater for MSMEs than for the large companies and multinationals (Gbetnkom 2012; Seker and Yang 2012).

With respect to this issue, a related strand of the literature focuses on the role of social capital in the credit market that supposedly stimulates the opposite mechanisms. By increasing the level of trust and reducing the asymmetric information characterizing credit contracts, social capital improves the credit conditions for firms – thereby easing their access to bank loans (Uzzi 1999; Guiso, Sapienza, and Zingales 2004; Moro and Fink 2013; Mistrulli and Vacca 2014) – and facilitates the collection of soft information, which in turn reduces adverse selection and moral hazard phenomena.

3. Data and Methodology

3.1 Data Description

Most of the data that we use in the paper comes from the SAFE, which is jointly run by the European Central Bank (ECB) and the European Commission (EC) and has been conducted every six months since 2009 with the aim of collecting economic and financial information about European MSMEs. Each wave of the survey is addressed to a randomly selected sample of nonfinancial enterprises from the Dun & Bradstreet business register; firms in agriculture, public administration, and financial services, however, are deliberately excluded.

We conduct our tests on a subsample of enterprises chartered in the 11 largest euro area economies (i.e., Austria, Belgium, France, Finland, Germany, Greece, Italy, Ireland, the Netherlands, Portugal, and Spain), where the differences in the micro and macroeconomic features, as well as in the socio-institutional environment, are relevant.

All the macrodata that we employ as control variables in our regressions are retrieved from different sources (i.e., Heritage Foundation, Worldwide Governance Indicators, OECD, ECB Data Warehouse, World Bank).

Therefore, our sample consists of 68,115 firm observations and is stratified by country, firm size, and activity. Table 1.a shows the distribution of our observations by country, with France, Germany, Spain, and Italy exhibiting the highest sample representativeness. Table 1.b, on the other hand, displays the distribution of our sample observations by firm size.

Table 1. a. Observations by Country

Country Name	Observations	
	Freq.	**%**
Austria	4,101	6.02
Belgium	4,075	5.98
Finland	3,787	5.56
France	9,991	14.67
Germany	9,950	14.61
Greece	4,088	6.00
Ireland	3,708	5.44
Italy	9,930	14.58
Netherlands	4,239	6.22
Portugal	4,288	6.30
Spain	9,958	14.62
Total	68,115	100.00

Table 1. b. Observations by Firm Size

Firm Size	Observations	
	Freq.	**%**
Micro (up to 9 employees)	22,921	33.65
Small (between 10 and 49 employees)	22,730	33.37
Medium (between 50 and 249 employees)	17,287	25.38
Large (more than 250 employees)	5,177	7.60
Total	68,115	100.00

3.2 Dependent and Key Variables

In order to assess whether corruption affects the access to bank credit of small firms, we employ question "q7a_a" of the survey as a dependent variable. In particular, the question is aimed at detecting whether a firm applied for bank loans, and if not, the reasons why it did not. More specifically, the question is:

[With regards to bank loans], "could you please indicate whether you: (1) applied for any over the past 6 months; (2) did not apply because you thought you would be rejected; (3) did not apply because you had sufficient internal funds; or (4) did not apply for other reasons"

The values from 1 to 4, outlined in parentheses, represent the way each respondent's answers were coded.

In the second stage of our investigation, we employ a dummy called Fear as a dependent variable. This dummy is generated by utilizing information from answer (2) of the above-mentioned question q7a_a – hence taking a value of one when an enterprise did not apply for fear of rejection, and zero when a firm did not apply for other reasons.

Then we identify two key variables for our analyses, namely the size of the firm and the country's level of corruption. The former is measured with a dummy (Small) that is equal to one when a firm has fewer than 50 employees, and zero otherwise. As regards the latter, it is worth noting that the literature recognizes a variety of measures that proxy for corruption: perception-based indicators, experience-based indicators, and objective measures such as the number of corruption-related trials or cases (Gutmann, Padovano, and Voigt 2014). In this paper, we decide to employ two alternatively comparable survey measures, namely Freedom from corruption (drawn from the Heritage Foundation) – whose score is primarily derived from Transparency International's Corruption Perception Index (CPI) – and Control of corruption (Worldwide Governance Indicators), which are both available for all the countries of our sample and on a yearly basis.

With regards to firm size, Figure 1 reports the percentage of small firms in our sample, by country. Interestingly, we note that in Belgium, Finland, Greece, and Ireland small firms cover more than 75% of all firm observations.

Figure 2 and Figure 3, on the other hand, show the average value of the two corruption indicators employed in our analyses, by country. For the sake of clarity, please note that the higher (lower) the value shown for each indicator, the lower (higher) the level of corruption in that country.

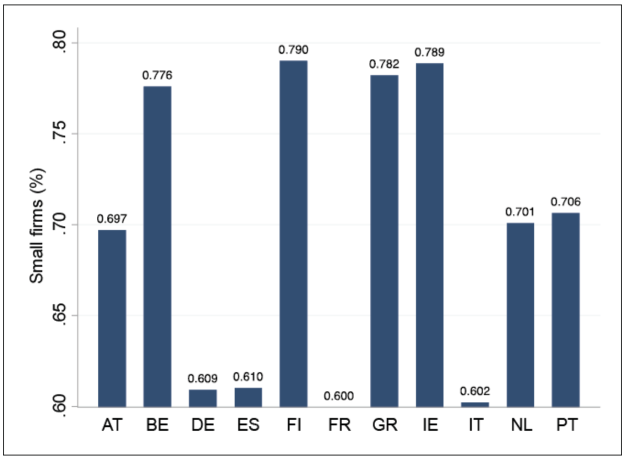

Figure 1. Percentage of Small Firms by Country

AT = Austria, BE = Belgium, DE = Germany, ES = Spain, FI = Finland, FR = France, GR = Greece, IE = Ireland, IT = Italy, NL = The Netherlands, PT = Portugal.

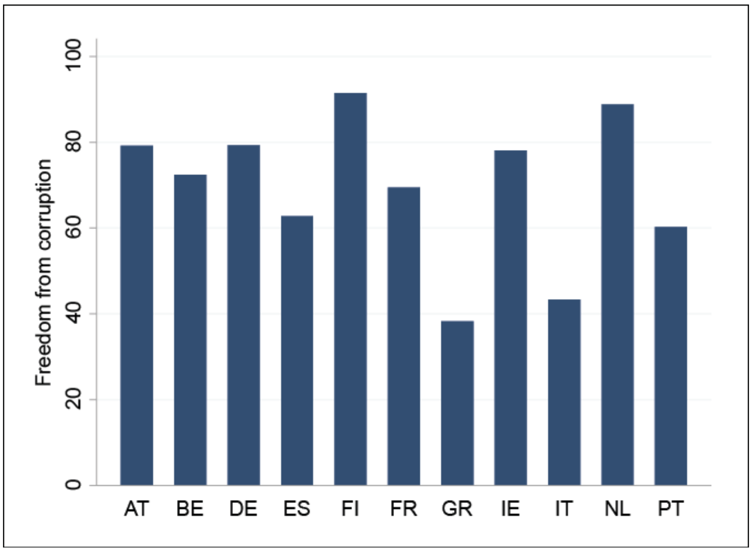

Figure 2. Freedom from Corruption by Country

AT = Austria, BE = Belgium, DE = Germany, ES = Spain, FI = Finland, FR = France, GR = Greece, IE = Ireland, IT = Italy, NL = The Netherlands, PT = Portugal.

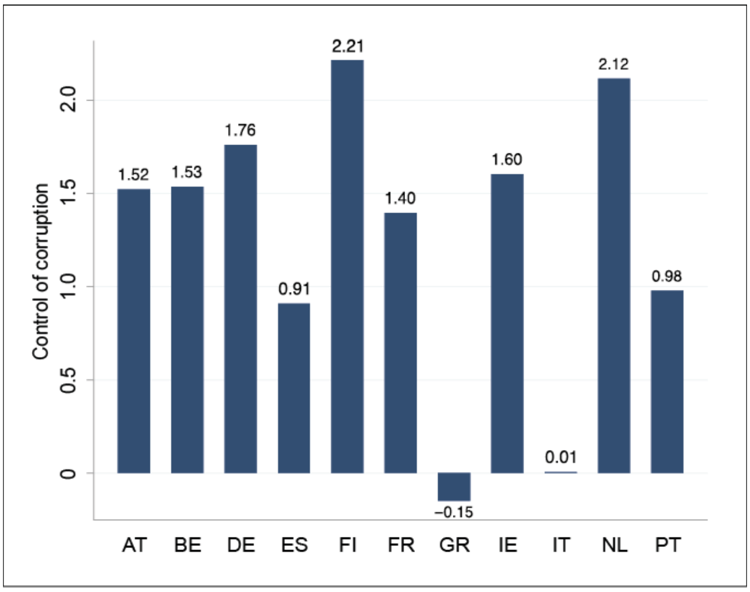

Figure 3. Control of Corruption by Country

AT = Austria, BE = Belgium, DE = Germany, ES = Spain, FI = Finland, FR = France, GR = Greece, IE = Ireland, IT = Italy, NL = The Netherlands, PT = Portugal.

Finally, Figure 4 depicts a picture of the level of corruption in the euro area through the use of a map. More specifically, based on the "Freedom from corruption" indicator, we assign different colors to the countries in our sample according to their perceived degree of corruption. In particular, we employ the following scale of colors to highlight the territories from the most to the least corrupt ones: red, orange, yellow, light green, and dark green. For instance, countries in red (i.e., Greece and Italy) represent the most corrupt economies. In contrast, areas in dark green (i.e., Finland and the Netherlands) are the least corrupt ones.

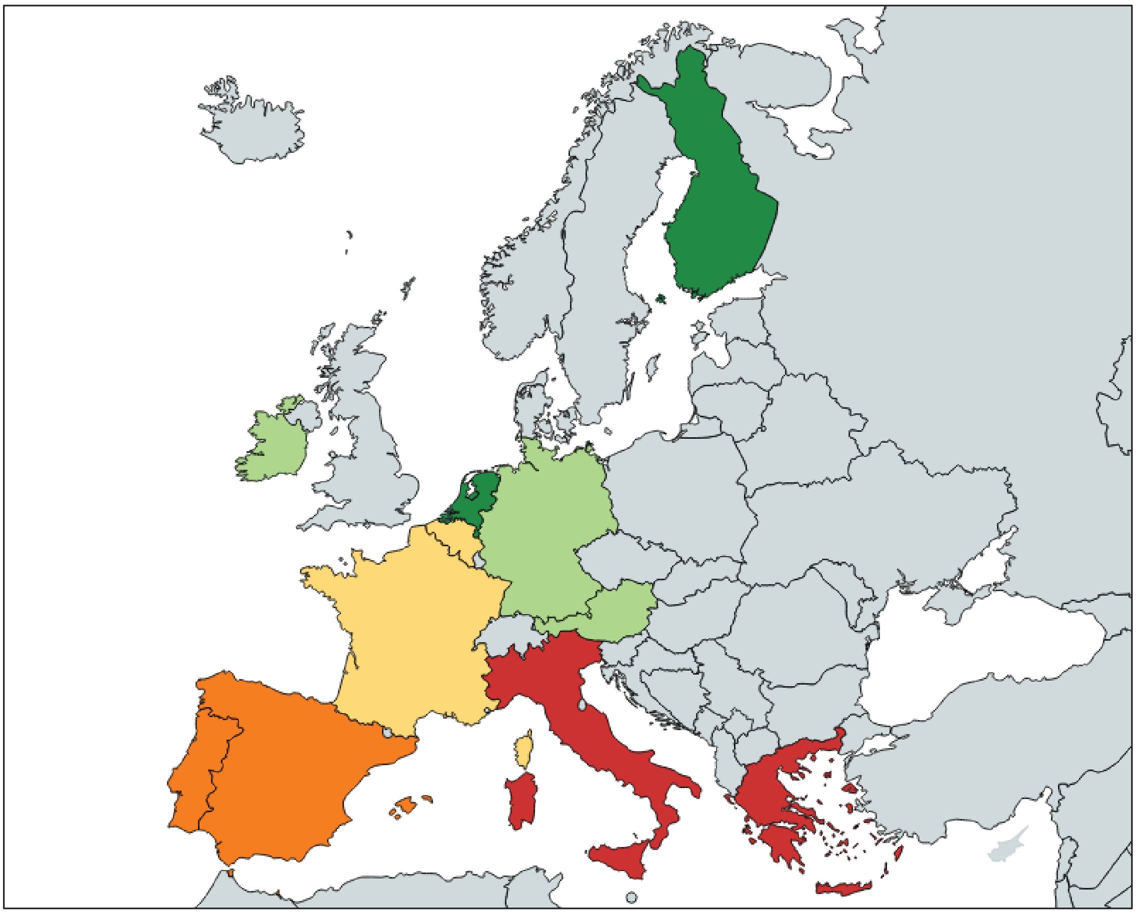

Figure 4. Map Depicting the Degree of Corruption in our Sample

Source = Map customized by the authors, according to the degree of corruption provided by the Heritage Foundation.

3.3 Econometric Strategy and Control Variables

For testing our hypothesis [H1], we model the probability of applying for bank loan for the *i-th* firm with the following specification [1]:

P_i (applying for loans) = f (small firms, corruption, firm controls, macro controls, country, wave) [1]

Small firms and corruption are the key variables in our model. The vector "firm controls" include both standard firm characteristics, such as age (very recent, recent and old), sector (construction, manufacturing, wholesale) and financial firm controls, such as changes (up and down) in leverage, in capital, in profitability, and in credit history of the *i-th* firm. The macro controls include GDP growth, the Herfindahl Index (HI) of bank concentration, Non-performing loans over gross loans (NPL ratio), and a dummy that captures the expansionary monetary policy phase that followed the Outright Monetary Transaction (OMT) announcement by the ECB. Finally, we use country and time dummies as additional controls.

Table 2. Summary Statistics

	Observations	Mean	Median	St. Dev.	p1	p99
Dependent variables						
q7a_a	68,115	2.626	3.000	1.094	1.000	4.000
Fear	50,096	0.083	0.000	0.276	0.000	1.000
Key variables						
Small	68,115	0.670	1.000	0.470	0.000	1.000
Freedom from corruption	68,115	67.588	69.000	15.489	34.000	94.000
Control of corruption	68,115	1.187	1.420	0.712	–0.250	2.220
Country-level controls						
GDP Growth	68,115	–0.620	0.050	2.934	–8.200	5.050
Concentration	68,115	0.088	0.060	0.077	0.021	0.370
NPL	68,115	7.101	4.295	6.254	0.500	31.899
OMT	68,115	0.437	0.000	0.496	0.000	1.000
Firm-level controls						
Profit up	68,115	0.238	0.000	0.426	0.000	1.000
Profit down	68,115	0.472	0.000	0.499	0.000	1.000
Credit up	68,115	0.204	0.000	0.403	0.000	1.000
Credit down	68,115	0.142	0.000	0.349	0.000	1.000
Capital up	68,115	0.243	0.000	0.429	0.000	1.000
Capital down	68,115	0.204	0.000	0.403	0.000	1.000
Leverage up	68,115	0.207	0.000	0.405	0.000	1.000
Leverage down	68,115	0.276	0.000	0.447	0.000	1.000
Demand up	68,031	0.191	0.000	0.393	0.000	1.000
Demand down	68,031	0.131	0.000	0.337	0.000	1.000
Very recent	68,115	0.020	0.000	0.139	0.000	1.000
Recent	68,115	0.069	0.000	0.253	0.000	1.000
Old	68,115	0.128	0.000	0.334	0.000	1.000
Construction	68,115	0.100	0.000	0.300	0.000	1.000
Manufacturing	68,115	0.255	0.000	0.436	0.000	1.000
Wholesale/Retail	68,115	0.337	0.000	0.473	0.000	1.000

We perform our analysis in three steps. First we estimate equation [1] by employing a multinomial logit model as in Demirguc-Kunt, Klapper, and Singer (2013) and Badoer and James (2016), because: *i*) our dependent variable is a discrete one, given that it takes more than two outcomes and the outcomes have no natural ordering (see description in Section 3.2); *ii*) it is suitable for the use of continuous variables and multiple categorical variables as regressors.

Second, we test model [1] by employing our Fear dummy (which captures the discouraged borrowers) as a dependent variable through the use of logit models, and further corroborate our findings with a series of robustness checks that we carry out via Heckman selection models. Additionally, to study the relation between the discouraged MSMEs and corruption, we interact the dummy Small (which captures small firms) with the two alternative measures of corruption.

Finally, we repeat our multinomial logit estimations by splitting the sample into low- and high-corruption countries in order to check whether the behavior of small firms changes according to the level of a country's corruption.

All regressions include time and country dummies. Calibrated weights are employed to adjust the sample to be representative of the population (as in Ferrando, Popov, and Udell 2017). Standard errors are corrected for heteroskedasticity, and clustered at the country-level, to remove possible bias in the estimations.

Table 2 shows the summary statistics of the variables employed in our analysis. Table A1 in the Appendix, meanwhile, provides descriptions of variables and sources.

4. Empirical Results

4.1 Multinomial Logit Models – Full Sample

The empirical results of our estimations regarding the likelihood that small firms will apply for bank loans are presented in Table 3. Following the assumptions of the multinomial logit methodology, here we set the first answer to question q7a_a (i.e., "applied") as our base outcome. Panel A (B) reports the estimate of model [1] when controlling for corruption as proxied by Freedom from corruption (Control of corruption). Estimated marginal effects are reported in brackets.

Overall, we see that – after having controlled for a wide set of firm characteristics – small firms are about 6.5% more likely than their larger counterparts to refrain from applying for bank loans due to fear of rejection (Column 2). Interestingly, we also note that the two proxies for corruption show a negative and significant coefficient – thereby signaling that a lower level of corruption in a country translates into a lower probability of refraining from applying for fear of rejection. In other words, our result anticipates that the share of discouraged borrowers should be lower when the quality of the economic environment is higher (i.e., when the degree of corruption is low).

Table 3. Bank Loan Applications: Multinomial Logit Model

	(1) Applied	(2) Did_not_apply _fear	(3) Did_not_apply _suff	(4) Did_not_apply _other
Panel A				
Small	(base)	1.034***	0.363***	0.528***
		(0.08)	(0.08)	(0.07)
		[0.064]		
Freedom from Corruption		–0.079**	–0.025***	–0.009
		(0.03)	(0.01)	(0.01)
SAFE Controls	YES	YES	YES	YES
Observations	68,115	68,115	68,115	68,115
Pseudo R-squared	0.0752	0.0752	0.0752	0.0752
Panel B				
Small	(base)	1.031***	0.361***	0.527***
		(0.08)	(0.08)	(0.07)
		[0.065]		
Control of Corruption		–1.764*	–0.746***	–0.893**
		(0.96)	(0.22)	(0.35)
SAFE Controls	YES	YES	YES	YES
Observations	68,115	68,115	68,115	68,115
Pseudo R-squared	0.0749	0.0749	0.0749	0.0749

Note: This table shows regression results of the multinomial logit model regarding the likelihood that small firms do not apply for bank loans. The dependent variable –as described in Section 3.2 – equals 1/2/3/4 if a firm applied/did not apply because of possible rejection/did not apply because of sufficient internal funds/did not apply for other reasons during the past six months, respectively. Small is a dummy that equals one if the firm has fewer than 50 employees, and zero otherwise. Regressions control for Freedom from corruption (Control of corruption) in Panel A (B). Though not showing, both specifications include a wide set of firm-level characteristics. See Table A1 in the Appendix for all variable definitions and sources. All regressions use sampling weights that adjust the sample to be representative of the population. Additionally, all regressions include time and country dummies. Heteroskedasticity-robust standard errors, clustered at the country level, appear in parentheses. Estimated marginal effects are reported in brackets. *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.

4.2 Logit Models – Fear of Rejection

As a second step of our investigation, we test our hypothesis by employing logit models and we further corroborate our findings through a series of robustness checks carried out via Heckman selection models. More specifically, to estimate equation [1] we now employ the dummy Fear (already described in Section 3.2) as a dependent variable.

Results are reported in Table 4 and Table 5, where we employ Freedom from corruption and Control of corruption as proxies for corruption, respectively. Moreover, the regressions displayed in both Table 4 and Table 5 vary, among the different columns, because of the progressive inclusion of the country-level controls (Column 2), and the interaction term with the proxy of corruption (Column 3). The inclusion of the latter is aimed at reducing concerns that the self-refrain behavior of the small firms is rather driven by their structural and financial characteristics than by the discouragement effect of corruption.

Table 4. Logit Model – with Freedom from Corruption

	(1)	(2)	(3)
	Fear	Fear	Fear
Small	0.632***	0.634***	0.081
	(0.09)	(0.09)	(0.30)
Freedom from Corruption	–0.067**	–0.049	–0.055
	(0.03)	(0.04)	(0.04)
Small x Freedom from Corruption			0.008**
			(0.00)
GDP Growth		0.081	0.081
		(0.06)	(0.06)
Concentration		–13.519*	–13.551*
		(7.98)	(7.98)
NPL		0.081***	0.081***
		(0.03)	(0.03)
OMT		–0.507***	–0.505***
		(0.16)	(0.16)
SAFE Controls	YES	YES	YES
Observations	50,096	50,096	50,096
Pseudo R-squared	0.0984	0.101	0.102

Note: This table shows regression results of the logit model regarding the likelihood that small firms do not apply for bank loans for fear of rejection. The dependent variable (Fear) – as described in Section 3.2– is a dummy that equals one if a firm did not apply because of possible rejection, and zero otherwise. Small is a dummy that equals one if the firm has fewer than 50 employees, and zero otherwise. Though not showing, all the models include a wide set of firm-level characteristics. See Table A1 in the Appendix for all variable definitions and sources. All regressions use sampling weights that adjust the sample to be representative of the population. Additionally, all regressions include time and country dummies. Heteroskedasticity-robust standard errors, clustered at the country level, appear in parentheses. *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.

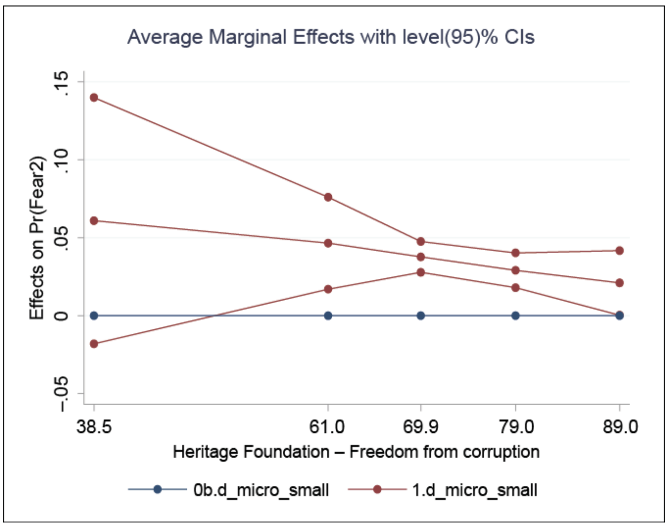

Figure 5. Marginal Effect of Small Firms Not Applying for Fear of Rejection for Different Levels of Corruption (as proxied by Freedom from Corruption)

The results from Table 4 highlight that – in line with the findings previously obtained with the multilogit analysis – small firms refrain from applying for bank loans for fear of rejection, as they anticipate a negative response from the lender. The variable Freedom from corruption presents a negative and significant sign suggesting that, when the level of corruption is lower, firms may experience a lower probability of self-restraint. Interestingly, the interaction between size and corruption shows a positive and significant sign. For this reason, we decide to plot the probability that a small firm does not apply for fear of rejection, for different levels of corruption (see Figure

5). Figure 5 shows that the higher the freedom from corruption (i.e., the lower the corruption), the lower the probability that small firms will not apply for a bank loan for fear of seeing their application rejected. Put another way, the lower the corruption, the lower the share of discouraged borrowers.

We now try to corroborate our findings by employing a different proxy of corruption, namely Control of corruption. The results, reported in Table 5, are consistent with those presented in Table 4. Namely, we find that small firms refrain from applying for bank loans, and we also see that corruption influences their financing strategy.

Table 5. Logit Model – with Control of Corruption

	(1) Fear	(2) Fear	(3) Fear
Small	0.627***	0.633***	0.409***
	(0.09)	(0.09)	(0.13)
Control of Corruption	–0.998	–0.664	–0.798
	(1.04)	(0.70)	(0.69)
Small x Control of Corruption			0.176**
			(0.08)
GDP Growth		0.057	0.056
		(0.04)	(0.04)
Concentration		–12.582	–12.622
		(8.67)	(8.68)
NPL		0.106***	0.106***
		(0.04)	(0.04)
OMT		–0.591***	–0.589***
		(0.15)	(0.15)
SAFE Controls	YES	YES	YES
Observations	50,096	50,096	50,096
Pseudo R-squared	0.0964	0.101	0.101

Note: This table shows regression results of the logit model regarding the likelihood that small firms do not apply for bank loans for fear of rejection. The dependent variable (Fear) is a dummy that equals one if a firm did not apply because of possible rejection, and zero otherwise. Small is a dummy that equals one if the firm has fewer than 50 employees, and zero otherwise. Though not showing, all the models include a wide set of firm-level characteristics. See Table A1 in the Appendix for all variable definitions and sources. All regressions use sampling weights that adjust the sample to be representative of the population. Additionally, all regressions include time and country dummies. Heteroskedasticity-robust standard errors, clustered at the country level, appear in parentheses. *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.

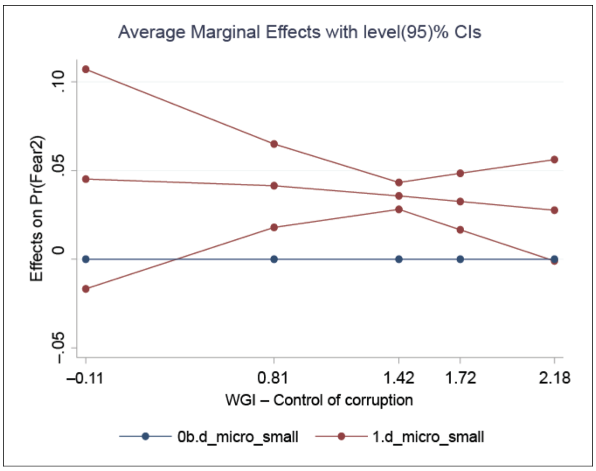

Figure 6. Marginal Effect of Small Firms Not Applying for Fear of Rejection for Different Levels of Corruption (as proxied by Control of Corruption)

As for the marginal effects, Figure 6 plots the probability that a small firm does not apply for fear of rejection, for different levels of corruption (as proxied by Control of corruption). The results – in this case too – show that the lower the degree of corruption, the lower the fear of rejection experienced by small firms.

4.3 Robustness Checks: Heckman Selection Models

In this section we present further robustness checks. Because the tests in Section 4.2 (i.e., logit models) have been conducted on a sample of firms that did not apply for bank loans (thereby excluding those who applied), one might raise concerns that our results are affected by a sample selection bias. To overcome this potential criticism, we re-estimate our models following the Heckman (1979) approach, which requires us to specify a selection equation that includes a set of variables affecting the possibility of observing the phenomenon but not the outcome itself. The results are displayed in Table 6 and Table 7 and corroborate our previous findings.

Table 6. Heckman Selection Model – with Freedom from Corruption

	(1) Fear	(2) Fear	(3) Fear
Regression equation			
Small	0.027***	0.027***	0.003
	(0.00)	(0.00)	(0.01)
Freedom from Corruption	–0.003***	–0.001*	–0.001**
	(0.00)	(0.00)	(0.00)
Small x Freedom from Corruption			0.000**
			(0.00)
GDP Growth		0.001	0.001
		(0.00)	(0.00)
Concentration		–0.437***	–0.433***
		(0.13)	(0.13)
NPL		0.005***	0.005***
		(0.00)	(0.00)
OMT		–0.029***	–0.029***
		(0.01)	(0.01)
SAFE Controls	YES	YES	YES
Selection equation			
Demand up	–1.364***	–1.364***	–1.364***
	(0.01)	(0.01)	(0.01)
Lambda (Mills ratio)	0.216***	0.214***	0.214***
	(0.01)	(0.01)	(0.01)
Observations	72,372	72,372	72,372
Prob> chi2	0	0	0

Note: This table shows regression results of the Heckman selection model regarding the likelihood that small firms do not apply for bank loans for fear of rejection. The dependent variable (Fear) is a dummy that equals one if a firm did not apply because of possible rejection, and zero otherwise. Small is a dummy that equals one if the firm has fewer than 50 employees, and zero otherwise. Though not showing, all the models include a wide set of firm-level characteristics. See Table A1 in the Appendix for all variable definitions and sources. All regressions use sampling weights that adjust the sample to be representative of the population. Additionally, all regressions include time and country dummies. Heteroskedasticity-robust standard errors, clustered at the country level, appear in parentheses. *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.

Table 7. Heckman Selection Model – with Control of Corruption

	(1) Fear	(2) Fear	(3) Fear
Regression equation			
Small	0.027***	0.027***	0.017***
	(0.00)	(0.00)	(0.01)
Control of Corruption	–0.042**	–0.019	–0.025
	(0.02)	(0.02)	(0.02)
Small x Control of Corruption			0.008**
			(0.00)
GDP Growth		0.001	0.001
		(0.00)	(0.00)
Concentration		–0.363***	–0.362***
		(0.12)	(0.12)
NPL		0.005***	0.005***
		(0.00)	(0.00)
OMT		–0.030***	–0.030***
		(0.01)	(0.01)
SAFE Controls	YES	YES	YES
Selection equation			
Demand up	–1.364***	–1.364***	–1.364***
	(0.01)	(0.01)	(0.01)
Lambda (Mills ratio)	0.216***	0.214***	0.214***
	(0.01)	(0.01)	(0.01)
Observations	72,372	72,372	72,372
Prob> chi2	0	0	0

Note: This table shows regression results of the Heckman selection model regarding the likelihood that small firms do not apply for bank loans for fear of rejection. The dependent variable (Fear) is a dummy that equals one if a firm did not apply because of possible rejection, and zero otherwise. Small is a dummy that equals one if the firm has fewer than 50 employees, and zero otherwise. Though not showing, all the models include a wide set of firm-level characteristics. See Table A1 in the Appendix for all variable definitions and sources. All regressions use sampling weights that adjust the sample to be representative of the population. Additionally, all regressions include time and country dummies. Heteroskedasticity-robust standard errors, clustered at the country level, appear in parentheses. *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.

4.4 Further Analysis: Multinomial Logit Models – Sample Split by Corruption

In this section we discuss the results obtained when estimating our equation [1] for two subsamples that we get by splitting the initial data set into low- and high-corruption countries. Indeed, after having calculated the mean level of Freedom from corruption across the full sample, we are able to build two distinct clusters that distinguish the low-corruption countries (observations above the mean) from the high-corruption ones (observations below the mean).[4] The results of our estimations are tabulated in Table 8.

[4]For the sake of clarity, the high-corruption countries are Greece, Italy, Portugal, and Spain. The low-corruption nations are Austria, Belgium, Finland, France, Germany, Ireland, and the Netherlands. In this regard, see Figure 4 that shows the degree of freedom from corruption by country.

Table 8. Bank Loan Applications – Multinomial Logit Model – Sample Split by Corruption

	(1) Applied	(2) Did_not_apply _fear	(3) Did_not_apply _suff	(4) Did_not_apply _other
Panel A: Low corruption				
Small	(base)	1.061***	0.333**	0.543***
		(0.09)	(0.13)	(0.12)
		[0.062]		
SAFE Controls	YES	YES	YES	YES
Observations	36,907	36,907	36,907	36,907
Pseudo R-squared	0.0677	0.0677	0.0677	0.0677
Panel B: High corruption				
Small	(base)	0.947***	0.461***	0.574***
		(0.17)	(0.03)	(0.06)
		[0.074]		
SAFE Controls	YES	YES	YES	YES
Observations	25,739	25,739	25,739	25,739
Pseudo R-squared	0.0713	0.0713	0.0713	0.0713

Note: This table shows regression results of the multinomial logit model regarding the likelihood that small firms do not apply for bank loans. The dependent variable –as described in Section 3.2 – equals 1/2/3/4 if a firm applied/did not apply because of possible rejection/did not apply because of sufficient internal funds/did not apply for other reasons during the past six months, respectively. Small is a dummy that equals one if the firm has fewer than 50 employees, and zero otherwise. Table A (B) reports regressions on a subsample of firms chartered in low- (high-) corruption countries. Though not showing, both specifications include a wide set of firm-level characteristics. See Table A1 in the Appendix for all variable definitions and sources. All regressions use sampling weights that adjust the sample to be representative of the population. Additionally, all regressions include time and country dummies. Heteroskedasticity-robust standard errors, clustered at the country level, appear in parentheses. Estimated marginal effects are reported in brackets. *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.

More specifically, Table 8 presents the coefficients and the marginal effects of our key variable small firms (Small) in the economies characterized by lower (Panel A) and higher (Panel B) levels of corruption. In both cases, the results in Column 2 confirm the evidence previously found in the overall sample – namely, small firms (in both regional clusters) are more likely not to apply for fear of rejection than larger enterprises. In particular, small firms are 7.4% (6.2%) more likely than their larger peers to refrain from applying for a bank loan for fear of rejection in high- (low-) corruption economies.

5. Conclusions

The global financial crisis worsened the conditions of access to the credit market for enterprises in Europe. Therefore, improving access to bank credit, especially for MSMEs, becomes important to safeguard the survival and development of their businesses. In this paper, we have attempted to assess how the level of corruption – combined with several economic and financial features – affected the access to credit for MSMEs during our observed period.

Specifically, our research hypothesis aims at testing whether a more corrupt environment affects MSMEs' expectations on the bank-firm relationship and in turn the probability to self-refrain from applying to bank loans more than larger firms. This may be the case because MSMEs anticipate more difficulties in having access to credit.

We employ different specifications. First we estimate the probability of self restraint for MSMEs, compared to larger firms, after controlling for alternative measures of corruption, as well as for a set of macro firm-invariant indicators and standard and financial micro features. Second, we focus on the phenomenon of the discouraged borrowers assessing how the level of corruption might affect their demand for credit. Additionally, in order to limit the source of bias between small firms, credit access and corruption, we interact small firms with the corruption measures. Finally, to corroborate our results and avoid the selection bias, we propose several econometric strategies and different subsamples of observations.

Overall, our results show that the level of corruption seems to affect the behavior of small firms in the credit market since they are more likely to refrain – especially in high-corruption countries – from applying for bank loans than their larger peers. Interestingly, results indicate that small firms chartered in high-corruption economies are more likely to refrain from applying for loans (more than 7.4%) than small firms located in low-corruption ones (about 6.2%).

Results turn to be robust to different specifications and econometric methodologies. Nevertheless, we are aware that – although we have tried our best to limit the presence of bias in our estimates – given the qualitative nature of the SAFE dataset, missing information might still play a role in explaining the relationship between bank access, small firms and the level of corruption. Our results seem to suggest that policymakers should intervene in most corrupt countries in order to limit the aforementioned negative spillovers and to support the access to bank credit for small firms.

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APPENDIX A

Table A1. Variable descriptions and sources

Variables	Description	Source
Dependent variables		
Bank loans application	Variable that equals one/two/three/four if a firm applied/did not apply because of possible rejection/did not apply because of sufficient internal funds/did not apply for other reasons during the past six months, respectively.	ECB: SAFE
Fear	Variable that equals one if a firm did not apply for a bank loan because of possible rejection during the past six months.	ECB: SAFE
Key variables		
Small firms	Dummy variable that equals one if the firm has fewer than 50 employees.	ECB: SAFE
Country-level controls		
Freedom from corruption	The higher the level of corruption, the lower the level of overall economic freedom and the lower a country's score.	Heritage Foundation
Control of corruption	The higher the level of corruption, the lower a country's score.	World Bank: WGI
GDP Growth	The annual growth rate of real GDP based on averages of quarterly data for each survey round.	OECD
Concentration	The Herfindahl index (HI) of total assets concentration (for the banking sector).	ECB: Data Warehouse
NPL	The ratio of bank nonperforming loans to total gross loans.	World Bank
OMT	Dummy variable that equals one from the year of announcement (2012) of the Outright Monetary Transactions (OMT) program.	Our calculation
Firm-level controls		
Profit up	Dummy variable that equals one if a firm experienced an increase of the net income after taxes in the past six months.	ECB: SAFE
Profit down	Dummy variable that equals one if a firm experienced a decrease of the net income after taxes in the past six months.	ECB: SAFE
Creditworthiness up	Dummy variable that equals one if the firm's credit history improved in the past six months.	ECB: SAFE
Creditworthiness down	Dummy variable that equals one if the firm's credit history worsened in the past six months.	ECB: SAFE
Capital up	Dummy variable that equals one if a firm's own capital has improved in the past six months.	ECB: SAFE
Capital down	Dummy variable that equals one if a firm's own capital has deteriorated in the past six months.	ECB: SAFE
Leverage up	Dummy variable that equals one if a firm experienced an increase in the debt-to-assets ratio in the past six months.	ECB: SAFE
Leverage down	Dummy variable that equals one if a firm experienced a decrease in the debt-to-assets ratio in the past six months.	ECB: SAFE
Demand up	Dummy variable that equals one if a firm's needs for a bank loan increased in the past six months.	ECB: SAFE
Demand down	Dummy variable that equals one if a firm's needs for a bank loan decreased in the past six months.	ECB: SAFE
Very recent	Dummy variable that equals one if the firm is less than 2 years old.	ECB: SAFE
Recent	Dummy variable that equals one if the firm is between 2 and 5 years old.	ECB: SAFE
Old	Dummy variable that equals one if the firm is between 5 and 10 years old.	ECB: SAFE
Construction	Dummy variable that equals one if the firm's main activity is construction.	ECB: SAFE
Manufacturing	Dummy variable that equals one if the firm's main activity is manufacturing.	ECB: SAFE
Wholesale/Retail	Dummy variable that equals one if the firm's main activity is wholesale or retail trade.	ECB: SAFE

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The Impact of the Audit Committees' Properties on the Quality of the Information in the Banking Financial Reports: A Survey on Saudi Commercial Banks

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Abstract

This study aims to identify the impact of the audit committees' properties on the quality of the information of the banking financial reports in the Saudi commercial banks by identifying the effect of identifying tasks and duties, independence, accounting and banking experience and efficiency of the audit committee on achieving the quality of the Saudi banking and financial reports. 110 questionnaires were distributed on the research sample and 105 questionnaires were received and analyzed through ANOVA. Results indicate that the availability of the audit committees' properties affect increasing the quality of the financial reports in the Saudi banking at the level of properties as a whole where the (P) probable value was (0.000), which is less than 0.05. It represents the functions and duties of the audit committee, the committee's independence in banks, the availability of the accounting and banking experience for the members of the audit committee and the efficiency of the audit committees at banks. The study recommends more emphasis on the diversity of the experiences of the members of the audit team and thus; the committee can performs its functions in a more efficient and effective way.

Keywords: commercial banks, audit committee, the quality of financial reports, banking accounting experience

1. Introduction

Attention has been increased with the presence of the audit committees in the companies in recent times after many cases of financial collapse and corruption in a large number of companies in many countries. Additionally, the main functions of the audit committees turned to examine the financial reports, whether periodic or annual, and describe them before submitting them to the board of directors. The reason is that the foundation of forming the audit committees in companies is to ensure the quality of the financial reports, the availability of quality in information and to expand the benefits of such information.

Currently, the audit committees have received an increasing attention from the public shareholding companies because they are considered a fundamental pillar of the quality of the financial reports information. Accordingly, there must be certain properties in the committee enabling it to perform its duties properly. Therefore, this study is to highlight the impact of the audit committees' properties on achieving the quality of the financial reports of the Saudi commercial banks through the comprehensiveness of the accounting disclosure of information needed by the users of accounting information in the Kingdom of Saudi Arabia.

Research Problem: The research problem is that the audit committees of banks should be characterized by certain characteristics enabling them to perform their supervisory and control role on the financial performance of banks in selecting and isolating the financial references and reports which can affect the quality of the published financial reports of these banks. Subsequently, the problem can be addressed in the following questions:

The Main Question: Does the availability of the qualitative characteristics of the audit committee affect the achievement of the quality of the information of the banking financial reports? The following questions are stemmed from it:

1. What is the impact of the predetermination of the functions and duties of the audit committee on the quality of the information of the banking financial reports?
2. Does the independence of the members of the audit committee affect the quality of the information of the banking financial reports?
3. Does the availability of the accounting and banking experience of the members of the audit committee affect the quality of the financial banking reports?
4. What is the impact of the efficiency of the audit committees in banks on the quality of the information of the banking financial reports?

Research Importance: the importance of the study can be addressed through the following:

1. Scientific (theoretical) importance: Bridging the gap in the published studies on the impact of the audit committees by focusing on the properties of the audit committees and linking them with the quality of the information of the banking financial reports, and alerting researchers and those interested in the subject for conducting more research on the subject of audit committees.
2. practical (applied) importance: the research contributes in clarifying the importance of having certain characteristics in the audit committees in the Saudi commercial banks to achieve the quality of financial reports. It is expected that this study contributes to the statement of the audit committees' practices in the Saudi commercial banks and their ability to achieve the quality of the information of the banking financial reports and achieve the efficiency and effectiveness of their internal controls.

Therefore, the study mainly aims to investigate the impact of the audit committee's properties on the quality of the published information of the banking financial reports for the Saudi commercial banks by identifying the impact of the audit committees' properties (determining tasks and duties, independence, accounting and banking experience and efficiency of the audit committee) on achieving the quality of the information of the Saudi banking financial reports.

Methodology: The descriptive, analytical approach is used to describe the phenomenon and analyze the data through the distribution of the questionnaire form to a sample of Saudi commercial banks and analyzing it by the statistical methods using the SPSS.

Research Hypotheses: The research examines the following hypotheses:

Main Hypothesis: there is a statistically significant effect for the identification of the characteristics of the audit committee in the quality of the information of the banking financial reports. The following assumptions are stemmed from it:

1. There is a statistically significant impact to determine the functions and duties of the audit committee on the quality of the information of the banking financial reports.

2. There is a statistically significant effect of the independence of the audit committee on the quality of the information of the banking financial reports.

3. There is a statistically significant impact for the availability of the banking accounting experience for the members of the audit committee on the quality of the information of the banking financial reports.

4. There is a statistically significant effect of the efficiency of audit committees in banks on the quality of the information of the banking financial reports.

Procedural Definitions of the Study Variables:

1. The independence of the audit committee: a sub-committee composing of a number of the board members whose members are independent (non-executive); it acts as a liaison to coordinate the work of the external auditor and management leading to support the auditor's independence, which is addressed through:

a. Determining the functions and duties of the audit committee: it is represented in reviewing the financial statements, appointing the external auditor, audit plan and results, internal control system and ensuring the quality of the accounting information

b. The independence of the audit committee: it means that the members of the audit committee are enjoyed with full independence from the executive management and that they are free to express their opinion in the performance entirely.

c. Banking and financial experience: the members of the audit committee should be fully aware of the accounting principles and basics as well as the banking risks.

d. The efficiency of the members of the audit committees: it is concerned with the efficiency in the performance of the job and the tasks properly and this is achieved by planning, organization and supervision.

2. The dependent variable: the quality of the information of the banking financial reports: the information is described as good if it is characterized by specific qualities that meet the needs of their users.

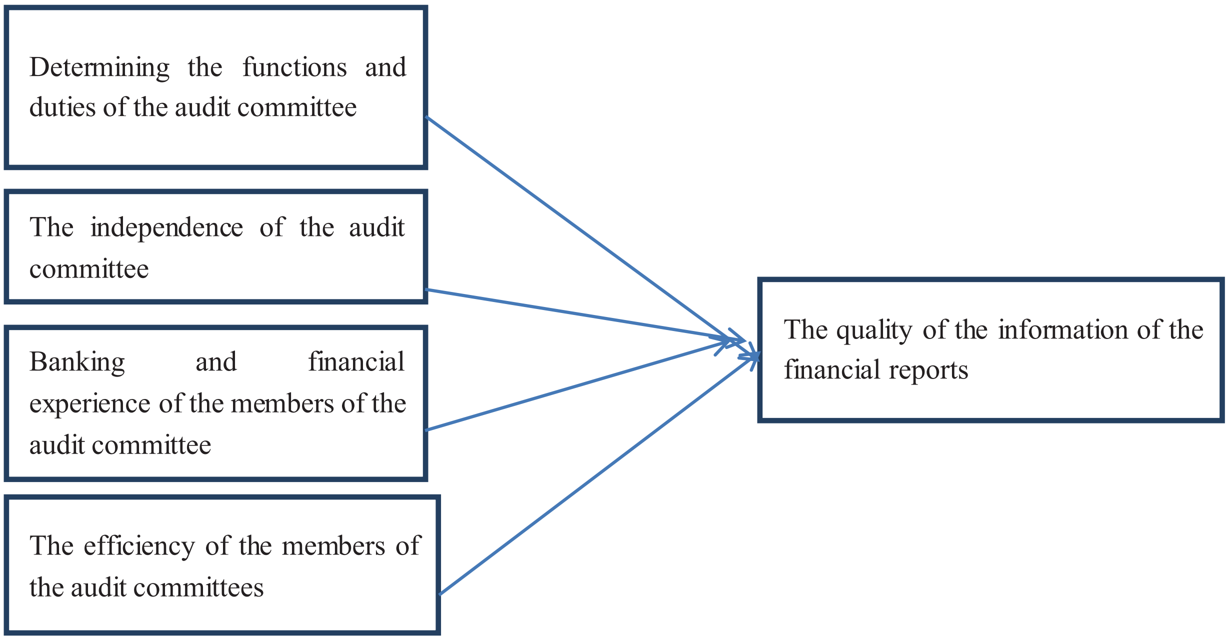

Figure 1. variables of the research model

Research Organization:

The research was divided into four areas: the general framework of the research, the theoretical framework and previous studies, the field study and the findings and recommendations.

2. Literature Review

The concept of audit committees: it is a committee consisting of the members of part-time members of the Board of Directors to supervise the function of the internal audit which increases the independence of the internal audit department; the greater the relationship between the audit committee and the management of the internal audit, the more the availability of independence and objectivity in examination and report (Abu Saud, 2005: p. 334). It is also known as "a committee that is represented in the number of the members of the board of Directors who hold the responsibility of helping reviewers (among other responsibilities) so as to maintain the neutrality of the administration" (Odeniz and Bock, 2005: p. 123).

Importance of Audit Committees: The importance of audit committees is represented in the following: (Radhi 2010: p. 481):

1. Maintaining the auditor's independence (indoor, outdoor) since the audit committee represents the link between the auditor and the company's management; however, there are many factors, whether economic or accounting leading to increasing importance of audit committees, which are:

A-great development and expansion in the economic activities and the growing importance of public shareholding companies.

B- Weakness of the regulatory system in the joint-stock companies, and the administration's pressure on the external auditor on some issues.

C-proliferation of lawsuits against private auditors especially in the USA.

D-the role of the audit committee in reducing the incidence of fraud, manipulation, the increase of the effectiveness of the internal control environment and strengthening the auditor's independence.

2. Asking for money markets from all the listed companies in the financial market companies to have audit committees; most recommendations called for audit committees and that their members should be non-executive

members of the board of directors and at least, they should not be employees of the company (Al-Ashmawi, 2006).

Audit Committees characteristics: The basic characteristics of audit committees are as follows:

1. The clarity of the functions and duties of the audit committee of the bank: some believe that there must be a set of controls so that the committee can claim its functions efficiently and effectively (Nasr and Shehata, 2006: p. 304):

(A) A clear identification of powers and responsibilities of the committee that the powers and responsibilities of the audit committee should be determined in a detailed and clear way.

(B) The need of the availability of experience and training among the members of the audit committee; it is also agreed that the members of the audit committee must be non-executives and be characterized with ability, experience and skill in following up and assessing the internal control systems.

(C) The need of determining the appropriate number of the members of the audit committee: it is necessary to determine the number of the members of the audit committee to ensure it is enough to bring more expertise and capacities that will enable the committee to achieve its goal.

2. Committee's independence at banks: it is one of the most important characteristics that must be available among the members of the audit committee where the independence allows the audit committee to carry out its duties and responsibilities and help it make decisions without bias; the audit committee must be composed of consultants that serve as an advisory body for the auditors' work and it must be independent from the management; this was confirmed by Tredaoa Committee Report in 1987, which presented many recommendations to curb fraud in the financial statements and improve the regulatory performance in the facilities and present independent audit committees that supervise the independence of the external and the internal auditors (Al-Saka, 1995: p. 30) .

3. The availability of the banking and accounting experience among the members of the Audit Committee:

Through the confirmation of the independence element and activities, the audit committees are linked with selecting individuals with experience in this field and determining and defining their experience and characteristics as well as the importance of defining independence; the most important recommendations of BRC Committee were supporting the role of audit committees since the first recommendation is related to defining the independence of audit committees and their period and the second recommendation is related to the experience and training of the members of the audit committee and the qualifications of its members in terms of the banking and financial aspects (Al-Wabil, 1996 : p. 30).

4. Efficiency of audit committees in banks:

In order that the audit committee carry out its functions efficiently, it must have the ability to get the proper information at the right time; there are some characteristics making the audit committees do their job efficiently and effectively, such as (Radi, 2010: 451):

1. The formation of the audit committee of a number of non-executive members of the board of directors who must not be less than three; the members must have one expert in the financial and accounting affairs; one member or more should be appointed from outside the non-executive members of the board of directors.

2. The Committee should meet regularly with a specific program not less than once in three months.

3. The company must develop sufficient capabilities at the disposal of the committee and it must help it perform its job including the help of experts.

From the above, we conclude that there must be some basic characteristics enabling the audit committees to perform their various tasks.

The concept of financial reports: Financial reports are the product of the accounting system. They must contain true, accurate and appropriate information for the purpose intended for in the right time (Jarbou, 2001: p. 164) and it is defined by (AL-fadag, 2002: p. 23) as "means to deliver information related to accounting which are not limited to the financial statements". (Radi, b, 2004: 7) defined it as "the main means used to connect the financial information to the external parties and it includes the balance sheet, income statement, cash flow statement, and changes in equity statement; the financial reports do not include the financial statements only but they extend to include other means to connect related or unrelated information that is extracted from the accounting system" (Hammad, 2005: p. 35).

Characteristics of the information provided in the financial reports:

The characteristics of the information provided in the financial reports are as follows:

1. Relevance, information is relevant when it affects the economic decisions of users by helping them correct the past and current events in the estimation of the net cash flows or confirming or correcting the previous estimates (FASB, 2006); its main goal is choosing the methods of measurement and disclosure that help people who rely on the financial statements to make decisions.

2. The relative (physical) importance, the degree of the information's impact on decision makers; it is linked to a range of considerations, including the type of information, whether regular or irregular and the extent of their relationship with certain decisions at the enterprise level, or the level of its users (Atiya, 1999: p. 46); the relative importance depends on the estimated size of the error in the light of the special circumstances of deletion or distortion (Hammad, b, 2006: 93).

3. Reliability, information has reliability if it is free of errors and far from bias; users can rely on it as information accurately reflecting what is intended to express or what is expected to express (Aldahrawi, 2004: p. 38).

4. Neutrality, it means impartiality; this element interferes clearly with the reliability of the information because the biased information by its nature cannot be relied on (financial accounting commission for banks and financial and Islamic institutions, 1994: p. 36)

5. Comparability, it means the characteristics that make the comparison possible in order to facilitate analysis, forecasting and decision-making by creditors, investors and others (Hanan, 2003: p. 207); the information that is measured and presented in the same way are considered comparable; it also enables users to verify the similarities and differences in the economic phenomena.

6. Consistency, it means the need to apply the accounting methods and policies from one period to another unless there were significant changes calling for a change in these policies; this property is linked to the viability of comparable information and it is considered a property overlapping between convenience and reliability in a manner that achieves the usefulness of the information.

You can say that the basic characteristics of the audit committees help them do their main job and help maintain the quality of the financial reports information.

3. Previous Studies

The previous studies related to the variables of the study are presented as follows:

1. (Memullen D, 1996): The problem of the study is represented in the role of the audit committees in increasing the accuracy of the information published in the financial statements. It aimed to identify the role of the audit committees in increasing the accuracy of the information published in the financial statements for two groups of US companies. It resulted that the companies have audit committees if the external auditor is not changed or isolated when there is a professional disagreement, if there is a relative decrease in the incidence of illegal financial actions and if the degree of confidence in the financial statements information increases especially for the businesses with their listed shares in the stock exchange.

2. (Noland et.al, 2004): the study problem is identifying the added value of the commercial banks having audit committees and the quality of the audit committees that benefit the commercial banks. The study aimed to analyze the added value added by the presence of audit committees in the small commercial banks. The study found that the presence of audit committees in banks is insufficient because of the sensitive nature of the banking business; therefore, the audit committees must at least have a member with banking and financial experience, which helps reduce irregularities in legislations for the organization, cases of embezzlement and theft by the employees as well as irregularities and technical mistakes in the job. Accordingly, the results of this study confirm the importance of the presence of members experienced in the field of work practiced by the foundation within the audit committees of this institution.

3. (Shami, 2006): The study problem is represented in answering the question of what is the impact of audit committees on the quality of the financial reports information? This study showed the importance of composing audit committees since they support the objectivity and credibility of raising the quality level, support confidence in the quality of the financial reports, reduce manipulation by the management, improve the quality of the internal audit level, provide protection for users of financial reports, strengthen the independence of the external auditor, and reduce shortcomings in controlling the financial report.

4. (Schadéwitz & Turley 2008): the study problem lies in the analysis of the characteristics of the audit committee with the quality of the financial reports and the study concluded that if the financial size and expertise did not affect the audit committee, the committee should audit the estimated profits; the most active audit

committees are better able to determine the earnings management and then contribute to the quality of the financial reports since the active audit committee is well-informed on the state of the company or it is equipped with members who devoted their time and effort to work in the committee which leads to better control.

5. (Sori, et. Al, 2009) The study conducted. sought to know the role of audit committees in supporting the independence of the external auditor. The study was conducted on the financial companies listed in the Malaysian financial market in an attempt to improve the control procedures that support the corporate governance. Questionnaires were distributed on 87 bank agents in addition to interviews conducted with bank employees. Results showed that the majority of respondents confirmed that the independence of the external auditors was supported through the audit committees.

6. (Qutaishat, 2010): the study problem lies in the availability of characteristics needed to improve efficiency within the audit committees formed in the Jordanian public shareholding companies. Do the audit committees perform the necessary tasks to achieve efficiency? the study also showed that the majority of the audit committees of the companies do their tasks entrusted to them by the external auditor, internal audit and the board of directors; the preference was for the financial sector followed by the service sector in practicing the tasks of the committee; as for the industrial sector, the study showed that there was a negligence in committee's practice of those tasks.

7. (Labib, 2011): The problem of the study is represented in the presence of deficiencies in the role of audit committees in restricting and reducing profits by the financial reports through answering the following main question: does setting a proposed framework for improving the effectiveness of the audit committees reduce profits through the financial reports; the study reached to several conclusions, including, the presence of a positive effect for the presence of the audit committee in reducing the profits management operations by the management leading to improving the quality of profits, developing and activating the properties and activities of the audit committee in the companies in Egypt which leads to improving the quality and credibility of the financial statements.

8. (Hamdan et al., 2012): The study problem is stated through the following questions: are the Jordanian public shareholding companies committed to the characteristics of the audit committees contained in the laws and regulations of Jordan. Do the profits announced by the Jordanian public shareholding companies characterized by quality? Is there an effect for the characteristics of the audit committee on improving the quality of the undisclosed profits? The study found a positive effect for the number of meetings of the audit committee in improving the quality of profits, a negative effect for the ownership of the company's shares by the members of the audit committee on the quality of profits and the lack of effect of the audit committees' characteristics such as the size of the audit committee, members' independence and experience on improving the financial quality of profits.

9. (Carcinoid, 2013): The study problem is represented in the extent of the adoption of the characteristics of the effectiveness of audit committees by the Jordanian laws and regulations, the commitment of the Jordanian public shareholding companies to apply the characteristics of effectiveness, and whether those characteristics impact in the reduction of earnings management. This study concluded that the Jordanian public Shareholding companies are committed to the application of the regulations of the private corporate governance by the characteristics of the audit committees as mentioned in the Jordanian legislations and that the characteristics of the audit committees represented in the size of the audit committees, the financial expertise of their members and the number of their meeting do not affect the reduction of earnings management; however, the independence of the members of the audit committees affect reducing the profits' management.

10. (Ali, 2013): The study problem is represented in studying the relationship between the audit committee and the effectiveness of the internal control in the Sudanese banks; the study aimed to evaluate the role of the audit committees in increasing the confidence level in the performance of the internal control in the Sudanese banks, determining the extent of the impact and implications of each factor of independence, experience, size and tasks in supporting the quality of the performance of audit committees for the purposes of achieving efficiency and effectiveness of the internal control in the Sudanese banks, and shedding light on the effectiveness of the performance of audit committees on achieving the internal control targets in the Sudanese banks. The study found a positive relationship between the independence, experience, size and functions of the audit committee and the effectiveness of the quality of the internal control in the Sudanese banks.

11. (Khallat & Masli, 2014): The study problem is focused on the question: What is the extent of the need for forming audit committees to support the efficiency and effectiveness of the internal audit in the Libyan industrial companies? The study concluded that there is an agreement among the participants in the study that the

formation of audit committees in the Libyan industrial companies contribute to the support and efficiency of the internal audit functions and the need for a set of considerations that enable the audit committee to support the efficiency and effectiveness of the internal audit function.

12. (Rachman & Gunawan, 2014) The study conducted by aimed to examine the effect of internal auditors, audit committees and board of commissioners on the quality of financial reports. The empirical study examined 22 banks listed in the Indonesian financial market in 2012. The study demonstrated a positive effect of the board commissioners with a percentage of (25.37%), a positive effect of the audit committees with a percentage of (19.35%), and a positive effect of internal auditors with a percentage of (30.41). However, the positive effect of other factors was not examined in this study.

13. (Kabbjee, 2015) the study's problem is represented in the role played by the audit committees in the study and evaluation of the internal control systems and their role in supporting the function of the internal auditor to carry out the tasks related to the assessment of the bank's policies related to money laundering; the study has come out with several conclusions, including that the audit committees should be committed to applying the tasks and responsibilities assigned to them, should enjoy necessary practices to do their tasks effectively in fighting the money laundering powers, and that they should contribute to the evaluation of the internal control system, support the function of the internal audit and support the external audit in fighting the money laundering operations.

14. (Al-Hassan, & Shabu, 2015) the study problem consisted of the fact that the composition of audit committees in the commercial banks do not take into account the efficiency and the financial and accounting expertise of the members of the audit committee, which showed a gap between the performance of the audit committee and the confidence of the financial reports in such banks; the study found that audit committee's lack of familiarity with the accounting principles reduced the efficiency of the performance of the external auditor, which lays doubts on the credibility of the financial statements, the lack of independence of audit committees in the banks from the executive management has weakened the control role of the committee and helped reducing the quality level of the professional performance of the external auditor and finally the lack of the clarity of the legal responsibility associated with the report of the audit committee that reduced the level of transparency in the financial reports of the bank.

15. (Mal et al. 2015) The study aimed to know the effect of the audit committees on the quality of the Nigerian financial reports through its characteristics, independence, and the held meetings. The study examined the financial reports of a sample involved the Nigerian banks in the period from 2003 to 2012. Pearson factor along with linearity were used. Results reached that the independence of the audit committees has a negative effect on the financial reports. Further, the held meetings conducted by the audit committees have a positive effect on the quality of the financial reports.

16. (Al-Matari et al. 2016) studied the effect of the characteristics of the Audit committees on the performance of the Yemeni banks by focusing on the meetings conducted between audit committees and internal auditors. The focus was placed on the suggestions and results of internal auditors work. The empirical study included a sample of 20 Yemeni banks through distributing 112 questionnaires. Results showed the importance of audit committees' role and the existence of a significant relationship between the audit committees and the banks performance.

17. (Kusnadi et al. 2016) conducted a study to examine the role of the audit committees through elements of independence, experience and the overlapped membership and their role in financial quality reports in the listed companies in Singapore. Results showed that the quality of the financial reports is much better of the various elements audit committees. Additionally, the independence of audit committees supports the quality financial reports and verify that there is no effect for overlapped membership on the quality reports.

4. Methods

The Study Sample and Population: the original study community consisted of a part of the Saudi commercial banks amounting to (11). The study sample consisted of four banks (36%) of the study population and it was selected randomly as the researchers distributed (110) questionnaires to the respondents out of whom 105 (95.5%) answered and returned the questionnaires after filling them with the required information in 2016.

Study Tool Description: the research tool is the means used in the initial collection of data on the phenomenon in question and the researchers have relied on the questionnaire as a tool to collect data of the study; the questionnaire was divided into two parts as follows:

The first section includes the personal information which includes five points:

1. Age:

Table 1. Frequency distribution of the members of the study sample according to the variable of age

Age group	Frequency	Percentage %
Less than 25 years old	15	14.3
25-35	51	48.6
35-45	28	26.7
45-55	11	10.5
55 and above	0	0
Total	105	100.0

The figure below shows the graph of the age groups

Table 1 shows that 14.3% of the members of the study sample are under 25 years, 48.6% are (25-35), 26.7% are (35-45) and 10.5% are (45-55).

2. Scientific Specialization:

Table 2. Frequency distribution of the members of the study sample according to the variable of scientific specialization

Specialization	Frequency	Ratio %
Accounting	29	27.6
Financial management	13	12.4
Business Administration	35	33.3
HR management	7	6.7
Other	21	20.0
Group	105	100.0

Table 2 shows that 27.6% of the respondents are specialized in accounting, 12.4% in financial management, 33.3% in Business Administration, 6.7% in human resources management and finally 20% in different specialties.

3. Scientific Qualification:

Table 3: Frequency distribution of the members of the study sample according to the scientific qualification

Qualification	Frequency	Percentage %
High School	5	4.8
Diploma	26	24.8
BA	74	70.5
M.A.	0	0
Other	0	0
Total	105	100.0

Table No. 3 shows that 70.5% of the members of the study sample hold the BA, 24.8% the Diploma, and 4.8% the secondary qualification.

4. Career position:

Table 4. Frequency distribution of the members of the study sample according to career position

Position	Frequency	Ratio %
administrator / Director	31	29.5
Member of the Audit Committee	5	4.8
Member of the audit team	5	4.8
Employee	63	60.0
Other	1	1.0
Total	105	100.0

Table 4 shows that 29.5% of the members of the study hold an administrative position, 4.8% of the respondents are among the members of the Audit Committee, 4.8% of the respondents are among the members of the audit team, 60% of the respondents are employees and finally 1% of the respondents occupy other positions.

5. Years of Experience:

Table 5. Frequency distribution of the members of the study sample according to years of experience

Years of Experience	Frequency	Percentage %
Less than 5	30	28.6
5-10	43	41.0
10-15	18	17.1
15-20	11	10.5
More than 20	3	2.9
Total	105	100.0

Table No. (5) shows that 28.6% of the members of the study sample have less than 5 years of experience, 41% of them had (5-10 years) of experience, 17.1% of them had (10 -15) years of experience, 10.5% had (15-20) years and finally 2.9% had more than twenty years of experience.

Validity and reliability of the study tool:

1. Arbitrators' validity: the researchers presented the questionnaire to a group of arbitrators composed of six specialists in the field of accounting and the researchers responded to the viewpoints of the arbitrators and conducted deletions and modifications in light of the submitted suggestions.

2. Scale's Validity through:

a. Cronbach's alpha coefficient: the researchers used Cronbach's alpha to measure the reliability of the questionnaire, and the results were as follows:

Table 6. Cronbach's alpha coefficient

Cronbach's alpha coefficient Value	number of items
.885	24

Table 6 shows that the high value of Cronbach alpha coefficient was (0.885) which indicates the reliability of the questionnaire.

Measuring the degree of reliability and validity of each axis of the questionnaire:

Table 7. Reliability and validity of each axis of the questionnaire

Axis	Reliability coefficient	Validity
Tasks and duties of the audit committee of the bank	.0.768	.876
committee independence at banks	.847	0.920
The availability of the accounting and banking experience for the members of the Audit Committee	.777	.881
efficiency of audit committees at banks	.793	0.891

Table 7 Shows that the validity of the axes of the study was: (0.876, 0.920, 0.881, 0.891), respectively; such results are an indication that the results of the study can be circulated to the society from which the sample was taken. The reliability values of the study axes were (0.768, 0.847, 0.777, and 0.793), respectively; furthermore, the total reliability of the study, which is an indication of the validity of the study tool (questionnaire) was used for the purpose of achieving the objectives of the study by answering its questions that it was (0.885); the value of the high reliability of the study tool on the possibility of the prediction of the results' reliability which can be resulted when application.

Descriptive statistics of the study data:

The first axis: functions and duties of the audit committees of banks

Table 8. Frequency distribution, arithmetic mean and standard deviation of the first axis

No.	Phrase	Strongly Disagree		disagree		neutral		agree		Strongly agree		Arithmetic mean	standard deviation	Sort by importance
		T	%	T	%	T	%	T	%	T	%			
1	The issuance of the audit committee reports is done within the annual reports of the bank	1	1	4	3.8	7	6.7	21	20	72	68.6	4.51	.856	1
2	regular meetings are held for the members of the audit committee of the Bank	0	0	0	0	6	5.7	30	28.6	69	65.7	4.60	.598	3
3	The audit committee presents the results of its job to the bank's board of directors	0	0	0	0	3	2.9	34	32.4	68th	64.8	4.62	.544	4
4	the performance of the executive management is assessed and a report is sent to the bank's board of directors	3	2.99	2	1.9	6	5.7	34	32.4	60	57.1	4.39	.904	5
5	Concerning with the regulatory procedures and protecting the bank assets	0	0	0	0	5	4.8	31	29.5	69	65.7	4.61	0.580	2
6	It conducts supervision immediately to check on the performance of the bank	7	6.7	3	2.9	3	2.9	33	31.4	59	56.2	4.28	1.114	6
	Full axis											4.13	0.717	agree

Table 8 shows that the general trend is "agree" to all the phrases of the axis with an arithmetic mean of 4.13 and a standard deviation of 0.717

The second axis: the independence of the audit committees in banks

Table 9. frequency distribution, arithmetic mean and standard deviation of the second axis

No.	Phrase	Strongly Disagree		disagree		neutral		agree		Strongly agree		Arithmetic mean	standard deviation	Ranking
		T	%	T	%	T	%	T	%	T	%			
1	There are nonexecutive members in the audit committee	3	2.9	7	6.7	20	19	35	33.3	40	38.1	3.97	1.051	4
2	The selection and election of the audit committee is done by shareholders and with the participation of the board of directors	7	6.7	6	5.7	22	21	39	37.1	31	29.5	4.77	1.137	5
3	The bank's audit committee participate in the bank in one session	5	4.8	8	7.6	21	20	44	41.9	27	25.7	3.76	1.070	6
4	There are specific requirements for punishing the audit committee in the case of its involvement in corruption	7	6.7	0	0	13	12.4	41	39	44	41.9	4.10	1.070	2
5	The independence of the audit committee is assessed by other parties on a regular basis	3	2.9	1	1	14	13.3	45	42.9	42	40	4.16	0.900	3
6	There are procedures, laws and regulations that control the job of the audit control	0	0	0	0	8	7.6	35	33.3	62	59	4.51	0.637	1
	Full axis											4.32	.519	Strongly Agree

Table 9 shows that the general trend is "strongly agree" to all the phrases of the axis by an arithmetic mean of 4.32 and a standard deviation of 0.519

The third axis the banking and accounting experience of the members of the bank's audit committee

Table 10. Frequency distribution, arithmetic mean and standard deviation for the third axis

No.	Phrase	Strongly Disagree		disagree		neutral		Agree		Strongly agree		Arithmetic mean	standard deviation	Ranking
		T	%	T	%	T	%	T	%	T	%			
1	Sufficient knowledge is available to the members of the audit committee of the banking and accounting aspects	0	0	0	0	7	6.7	40	58.1	57	54.3	4.48	0.623	2
2	There is a sufficient familiarity of the audit criteria and the professional conduct standards by the members of the audit committee	0	0	2	1.9	11	10.5	42	40	50	47.6	4.33	.742	6
3	the members of the audit committee can look at the management practices within the Bank	2	1.9	0	0	14	13.3	34	32.4	55	52.4	4.33	.851	3
4	Training seminars are organized for the members of the audit committee in the accounting field	2	1.9	2	1.9	16	15.2	31	29.5	54	51.4	4.27	.923	4
5	The members of the audit committee focus on studying and understanding the internal control system	0	0	1	1	8	7.6	36	34.3	60	57.1	4.48	.681	1
6	The members of the audit committee study the banking risks according to Basel	2	1.9	0	0	15	14.3	37	35.2	51	48.6	4.29	0.852	5
	Full axis											4.25	.519	Strongly Agree

Table 10 shows that the overall trend is strongly agree to all the phrases of the axis by an arithmetic mean of 4.25 and a standard deviation of 0.519.

Axis IV: the efficiency of the bank's audit committees

Table 11. Frequency distribution, arithmetic mean and standard deviation of the efficiency of the bank's audit committees

No	Phrase	Strongly Disagree		disagree		neutral		agree		Strongly agree		Arithmetic mean	standard deviation	Ranking
		T	%	T	%	T	%	T	%	T	%			
1	The bank's audit committee is involved in the appointment and removal of the external auditor	6	5.7	1	1	20	19	43	41	35	33.3	3.95	1.042	6
2	The audit committee studies and assesses the audit plan before hiring auditors	3	2.9	1	1	16	15.2	43	41	42	40	4.14	0.914	5
3	The audit committee is interested in evaluating the audit risk	0	0	0	0	17	16.2	33	31.4	55	52.4	4.36	.748	2
4	There is a coordination between the audit committee and both the internal and external auditors to study the auditing risks	0	0	0	0	14	13.3	37	35.2	54	51.4	4.38	0.712	3
5	The audit committee reports are directly sent to the board of directors	0	0	0	0	15	14.3	34	32.4	56	53.3	4.39	.727	1
6	The audit committee reports are issued within the final reports of the board of directors	4	3.8	0	0	12	11.4	38	36.2	51	48.6	4.26	.941	4
	Full axis											4.30	.552	Strongly Agree

Table 11 shows that the overall trend is "strongly agree" to all the phrases of the axis by an arithmetic mean of 4.30 and a standard deviation of 0.552.

The fifth Axis: the dependent variable (the quality of the information of the financial reports):

Table 12. Frequency distribution, arithmetic mean and standard deviation of the fifth axis

no	Phrase	Strongly Disagree		disagree		neutral		agree		Strongly agree		Arithmetic mean	standard deviation	Ranking
		T	%	T	%	T	%	T	%	T	%			
1	The financial information is published at the right time.	1	1	2	1.9	9	8.6	42	40	51	48.6	4.33	.793	4
2	The financial reports state all the bank's activities.	1	1	4	3.8	11	10.5	43	41	46	43.8	4.23	.858	7
3	the accounting information fits the needs of investors.	1	1	1	1	14	13.3	49	46.7	40	38.1	4.20	.777	8
4	The financial reports are published for more than a year to make a comparison in performance.	1	1	1	1	11	10.5	41	39	51	48.6	4.33	0.780	3
5	The information contained in the financial reports is accurate.	0	0	1	1	13	12.4	42	40	49	46.7	4.33	.716	6
6	The bank's customers get the distributions of their profits periodically.	0	0	0	0	15	14.3	40	38.1	50	47.6	4.33	.716	5
7	shareholders are satisfied with the general performance of the bank.	0	0	0	0	15	14.3	37	35.2	53	50.5	4.36	.722	2
8	The bank cares, analyzes and takes advantage of the customers' complaints	0	0	2	1.9	14	13.3	28	26.7	61	58.1	4.41	.793	1
	Full axis											4.36	0.430	Strongly Agree

Table 12 shows that the overall trend is "strongly agree" to all the phrases of the axis by an arithmetic mean of 4.36 and a standard deviation of 0.430

Testing Hypotheses:

Main Hypothesis: there is a statistically significant effect for the audit committee properties on the quality of the information of the banking financial reports? Emerging sub-hypotheses are as follows:

1. There is a statistically significant impact for determining the functions and duties of the audit committee on the quality of the information of the banking financial reports.

2. There is a statistically significant effect of the independence of the audit committee on the quality of the information of the banking financial reports.

3. There is a statistically significant impact of the availability of the banking and accounting experience for the members of the audit committee on the quality of the information of the banking financial reports.

4. There is a statistically significant effect of the efficiency of the audit committees of the banks on the quality of the information of the banking financial reports.

We will prepare a MANOCOVA table for testing the hypotheses through the following equation:

Y = B0 + B1X1 + B2X2 + B3X3 + B4X4 + e

Y: represents the dependent variable (the quality of the information of the banking financial reports)

X1: the independent variable (the functions and duties of the audit committee)

X2: the independent variable (the Committee's independence in the banks)

X3: independent variable (the availability of the banking and accounting experience of the members of the audit committee)

X4: the independent variable (the efficiency of the audit committees in banks)

B0: represents the division

(B1, B2, B3.B4): regression coefficients

Table 13. Estimation of multiple linear regression model to test all the variables

Variables	coefficient	Standard error	Statistical T.	Potential value
C	2.980	.352	8.473	.055
X1	-.114	.059	-1.942	.838
X2	.022	.105	.205	.813
X3	-.023	.099	-.237	.000
X4	.432	.081	5.349	.055
R-squared	.293			
Adjusted R-squared	.265			
SE of regression	0.368			
Sum squared reside	13:56			
F-statistic	10:38			
Prob (F-statistic)	0.000			

Table 13 shows that all the variables are statistically insignificant with the exception of variable x3, which is the availability of the banking and accounting experience. As for the level of the model as a whole, we note that the possible value of (P) was (0.000), which is less than 0.05; this confirms that all the independent variables explain the quality of the accounting information of the banks at the community level and not on the study sample, which means that the study sample is not enough or not random. But if we look at the value of the determination coefficient (0.29), it means that the variables explain (29%) of the difference in the banks' accounting information and (71%) is explained by other factors outside the model frame.

This also leads us to having doubts in the existence of multiple correlations among variables. If there is a linear correlation between two independent variables, this will necessarily lead to making the statistically significant variables non-significant, which leads to increasing the standard error rate, which in turn leads to a lower possible value of (T); this will make the possible value high making the statistically significant values non-significant; we will conduct a test for the multiple correlation among the independent variables through the independent variables matrix and detect the variables that caused the problem, delete it and then assess the model again.

Table 14. correlation matrix

X4	X3	X2	X1	
.236	.416	.505	1.000	X1
.540	.677	1.000	.505	X2
.525	1.000	.677	.416	X3
1.000	.525	.540	.236	X4

From the matrix above, we noticed that the variables (X1, X2) represent a high correlation ratio; we also note from the first regression model of table (13) the high possible value of the two variables (0.838,0.818), respectively because there is a statistical base stating that the greater the possible value of the variable, the less the statistical significance; therefore, we will assess the model after deleting the variables separately.

Estimation of the multiple regression model for the regression line equation after deleting variable (X1):

Y = B0 + B2X2 + B3X3 + B4X4 + e

Table 15. MANOCOVA Estimation after deleting variable (x1)

Variables	Coefficient	Standard error	statistical T.	Potential value
C	2.863	.351	8.151	.000
X2	-.048	.100	-.483	.630
X3	-.049	.099	-.496	.621
X4	.445	.082	5.457	.000
R-squared	.267			
Adjusted R-squared	.245			
SE of regression	.373			
Sum squared reside	14:07			
F-statistic	12:25			
Prob (F-statistic)	0.000			

Table 15 shows that after the deletion of variable (x1), the statistical significance of variable x3 was the availability of the banking and accounting experience which was meant that the quality of the information of the banking financial reports depends on the availability of the banking and accounting experience. As for the level of the model as a whole, we note that through the possible value of (P) which is (0.000) that is less than (0.05); this confirms that all the independent variables (the functions and duties of the audit committee, the Committee's independence, the availability of the banking and accounting experience of the members of the audit committee, and the efficiency of the banks' audit committees) explain the quality of accounting information of the banks at the community level and not at the level of the study sample; this means that the study sample may be inadequate or not random. However, if we look at the value of the determination coefficient which is (0.28), this means that the variables explain (28%) of the difference in the accounting information of the banks and the rest (72%) is explained by other factors outside of the model form.

Estimation of the multiple regression model for the regression line equation after deleting variable (X2):

Y = B0 + B1X1 + B3X3 + B4X4 + e

Table 16. MANOCOVA estimation after deleting variable (X2)

Variables	coefficient	Standard error	statistical T.	Potential value
C	2.995	.343	8.733	.000
X2	-.014	.087	-.161	.873
X3	.437	.077	5.710	.000
X4	-.110	.055	-2.002	.048
R-squared	.273			
Adjusted R-squared	.272			
SE of regression	.366			
Sum squared reside	13:57			
F-statistic	13.96			
Prob (F-statistic)	0.000			

Table 16 shows that after the deletion of variable (x2), the statistical significance of variables x3 and x4 which were the availability of the banking and accounting experience and the proficiency of the audit committees in the banks depending on the availability of the banking and accounting experience and the proficiency of the banks' committees. As for the level of the model as a whole, we note that through the possible value of (P) which is (0.000) that is less than (0.05); this confirms that all the independent variables (the functions and duties of the audit committee, the Committee's independence, the availability of the banking and accounting experience of the members of the audit committee, and the efficiency of the banks' audit committees) explain the quality of the accounting information of the banks at the community level and not at the level of the study sample; this means that the study sample may be inadequate or not random. However, if we look at the value of the determination coefficient which is (0.27), this means that the variables explain (27%) of the difference in the accounting information of the banks and the rest (73%) is explained by other factors outside of the model form.

Some of the criteria for selecting the appropriate model of assessment: the significance of the independent variables –the current possible value of (P) must be significantly less than (0.05) –the determination coefficient value must be larger than (60%) –the coefficient value should be consistent with the economic theory or be consistent with the proper expectation.

Table 17. Criteria of choosing model

Sample	Significance of variables	P value	value of the coefficient of determination	Coefficients Reference
All variables	One variable	0.00	0.29	Compatible
After deleting variable (x1)	One variable	0.00	0.27	Compatible
After deleting variable (X2)	Significance of two variables	0.00	0.27	Compatible

From the table above, we find that the right model for estimation was the MANOCOVA after deleting variable (X2), Table (16).

5. Results and Recommendations

5.1 Results

Through the theoretical framework of the study and the field study, we have reached the following results: the study found that the availability of the audit committees properties affect in increasing the quality of the financial reports in the Saudi banks at the level of the properties as a whole as the possible value of (P) was (0.000) which is smaller than (0.05), which are (the functions and duties of the audit committee, the Committee's independence, the availability of the banking and accounting experience for the members of the audit committee and the efficiency of the audit committees in banks); the highest rates of the approval of the study sample on the axes of the study were as follows:

1. Issuing the audit committee reports within the annual reports of the bank so that the committee can perform and follow up its tasks to issue the committee report within the bank reports.

2. There are procedures, laws and regulations that control the job of the audit committee, which confirms the independence of audit committees and the fact that they have laws and procedures that organize their tasks.

3. The members of the audit committee focus on studying and understanding the internal control system which is a proof for the availability of the accounting and banking experience of the members of the audit committees in the Saudi banks.

4. The Audit Committee reports are submitted to the board of directors directly, which confirms the availability of the property of independence and the efficiency of the audit committee in the Saudi banks.

5.2 Recommendations

Through the results of the study, the researchers recommended the following:

1. The need the banks focus on the audit committees' properties to play their part as required.

2. More focus on the diversity of the experiences of the members of the audit team so that the committee can perform its functions more efficiently.

3. The need to develop a guide explaining the characteristics and functions of each member of the audit committee.

4. Working on supporting the independence of the audit committee in banks and activating their role in a greater method.

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The Impact of Organizational Forgetting on Knowledge Management: Evidence from Pharmaceutical Industry in Egypt

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Abstract

Purpose: The purposes of this paper are to determine the impact of Organizational Forgetting (OF) on Knowledge Management (KM) among employees at the Pharmaceutical industry in Egypt.

Design/methodology/approach: Present study is conducted by descriptive-survey method and its population consists of employees at the Pharmaceutical industry in Egypt. 356 standard questionnaires were distributed of which 285 questionnaires (80%) were returned. To gather data, KM questionnaire devised by Jakob (2003) and Wiig (2003) and OF questionnaire devised by Fernandez & Sun, (2009) and Moshabbeki et al., (2012) are used.

Findings: The research confirmed a conceptual model for OF. Moreover, research results showed that there is a meaningful relationship between OF and KM. Research results also indicate that OF impacts on KM.

Research limitations/implications: Managers should encourage their employees to share their knowledge. Organizational knowledge can be created through individuals' interactions. This study has some limitations. First, this paper just focuses on organizations to find new perspective for the OF literature. Second, because of the scope of this research, interviewees are limited to individuals who have knowledge or take any seminars related to field of this sector. Other sectors must be considered to attain detailed knowledge related to OF because case-specific studies will bring new dimensions to the literature of OF.

Originality/value: First, this study makes a research contribution to the field of OF because studies related to OF mostly consist of conceptual papers. Second, I have introduced two new perspective to the concept of OF through this research paper.

Keywords: knowledge management, organizational forgetting

1. Introduction

Organizations of different types and sizes face many risks, as they seek to survive in a changing environment (Chong et al., 2009). Perhaps the most dangerous thing facing them is what is known as Organizational Forgetting (OF) which significantly affects the organization's competitiveness. Therefore, organizations are in an urgent need to know the causes and factors affecting them, as well as ways of prevention and treatment. This means that Organizations must manage OF well in order to determine which type of knowledge, whether old or new, must be disposed or retained. In this case, absorption capacity of organizational memory as well as the way of making benefit of it must be taken into account to keep up with constant changes in surrounding environment (Holan et al., 2004).

OF is a metaphor to understand how knowledge decay occurs in organizations (Holan & Phillips, 2004a, 2004b; Tsang & Zahra, 2008). However, it has been ignored by the theoretical literature (Holan, 2011; Besanko et al., 2010), yet organizations have an ability to create new knowledge, retain this knowledge and transfer knowledge to the whole organizations (Argote & Ingram, 2000; Rao & Argote, 2006) and forgetting is another important perspective because organizations are able to forget knowledge (Easterby-Smith & Lyles, 2003).

Many studies and applied researches, which tried to identify the OF, have shown that this variable is among the most important factors affecting functional innovation and learning. (Zeng & Chen, 2010; Esfahani et al., 2012; Mehrabi et al., 2013; Lopez & Sune, 2013). The challenge of each organization ensures that this knowledge transfers from person to group level and then to organization level and knowledge transferring. Process encounters to failure. This topic, proposes OF (Tabarsi et al, 2012).

OF has an effective role in organizations (Casey & Olivera, 2011; Sadeghian et al. 2012). OF is an important component of KM (Zeng & Yen, 2010; Ghorbanifard et al. 2014).

KM is one of the most important organizational components which need to establish a system for learning, gathering, stocking and distributing the knowledge inside an organization. Organizational naturally tend to forget (Conklin, 2001).

KM and OF are very important subjects for organizations to reach the desired objectives. In this context, our study focuses on the relationship between KM and OF. The study is structured as follows: Section one is introductory. Section two presents the literature review. Section three discusses the research methodology. Section four presents the hypotheses testing. Section five explains the research findings. Research recommendations will take place at section six. Conclusion will be provided at the last section.

2. Research Theoretical Basics

2.1 Organizational Forgetting Concept

Forgetting is a general process of putting useless and ambiguous knowledge aside (Hedberg, 1981). Forgetting is a process necessary to remove former ideas to accept more recent ideas. Before organizations try for new ideas and thoughts, they should put aside old ideas by revealing their faults (Nystrom & Starbuck, 1984).

The way to unlearn during an organizational crisis is by removing top managers as a group. This is because top managers are bolstered by previous successes and adamantly cling to their beliefs and perceptions therefore rationalizing their organizations' failures. Change in ownership is often another trigger of forgetting (Markoczy, 1994).

Forgetting is able to add a new and important aspect to our conception on organizational knowledge dynamism although it needs a special broad plan. Forgetting means to put aside old knowledge to create a new room in order to acquire new knowledge before, during and after learning processes. Forgetting has an important impact on effectiveness of organizational learning processes (Holan & Philips, 2004).

Forgetting means to forget old knowledge to create a new environment to acquire new knowledge during and after learning processes. Also, forgetting has an important impact on the effectiveness of learning processes in the organization (Halen & Phillips, 2004).

Forgetting has the potential of adding new important dimensions to our mind. Conditions such as environmental disturbance cause existing memory to be a challenge for information management. Therefore, shattering and renewing some parts of organizational memory is necessary. Forgetting is a main part of organizational dynamism and the relationship between OF and its dynamism is clear and obvious. Furthermore, forgetting play a key role in effectiveness of learning in an organization (De Holan & Philips, 2003, 2004b).

Forgetting has been studied as an essential process for change management (Akgun, et al., 2007).

Forgetting valuable information, techniques and knowledge of the organization can lead to lose competitive advantages while in some cases (De Holan, 2004; Fernandez, & Sune, 2009).

OF is critical for three reasons (1) simply being able to create new knowledge in an organization, or transfer needed knowledge from another organization, is not enough. Instances in which new knowledge disappears before it has been successfully transferred to the organization's memory have been documented. Avoiding forgetting acquired knowledge is therefore a critical part of OL (Day, 1994), (2) organizations sometimes forget things that they need to remember. Despite being transferred to memory, organizational knowledge decays over time and critical pieces of organizational knowledge may eventually be forgotten (Darr, et al., 1995), and (3) forgetting is sometimes an organizational necessity, such as when a new dominant logic needs to replace an old one. In this case, a failure to forget prevents new knowledge from being put into practice and reduces organizational effectiveness (Bettis & Prahalad, 1996, Lyles, 1992).

OF has three contexts (1) researches indicate that creating or transferring knowledge is not enough because knowledge is able to disappear before transmission to long-term memory via documentary (Day, 1994), (2) organizational memory decays over time and knowledge can be forgotten if the memory is not maintained (Holan & Phillips, 2004a, 2004b; Benkard, 1999, Argote, 1999), and (3) some writers emphasize forgetting is an organizational necessity to adapt organizational changes (Lyles & Schwenk, 1992; Prahalad & Bettis, 1986).

OF basically as lack of ability in benefiting organization's knowledge and experiences. In other words, OF is the failure of organization in benefiting learning which have happened in the past (Kransdorff, 1998).

OF is incapability in benefiting knowledge and past experiences of the organization. The most important subject which leads organization toward forgetting is inability in learning and spreading it in organization. The lack of applying knowledge as the result of learning, inability of the company in coding and documenting knowledge and not having stimulation to share it are the most important reasons of forgetting knowledge in companies (Synder, & Cumming, 1998).

OF isn't a lack of organization's ability in learning, sometimes it's necessary for the organization to put its present knowledge aside strategically and knowingly (Othman & Hashim, 2002).

OF is the intentional or unintentional loss of organizational knowledge at any level (Martin & Phillips, 2003).

OF is a concept of numerous and varied effects negatively and positively. It may be an intentional forgetting which seeks change acquisition, re-acquisition of knowledge, and abandonment of unneeded knowledge by the organization or in other words, reconstructing some parts of organizational memory. It is a positive loss of organizational knowledge (Holan et al., 2004).

OF lead to increase competition and to eliminate unfruitful elements of knowledge (Holan, 2004).

OF might be unintentional in terms of losing part of the knowledge. Therefore, an organization would become unable to carry out some of the activities which it has been able to do previously. This kind of forgetting is often detrimental to the organization as it happens when the Organization is unable to retain a portion of new knowledge in its own memory system. OF is the voluntary or involuntary loss of organizational knowledge. In other words, OF is loss of organizational knowledge voluntary or involuntary which can lead to changes in the organization capabilities (Halen & Phillips, 2004).

OF is the basic need for learning new organizational knowledge. This kind of forgetting requires design and time. Organizational performance can be a direct or indirect function of OF. An organization will not learn new knowledge without forgetting previous knowledge (Holan, Philips & Lawrence, 2004).

OF includes voluntary or involuntary loss of organizational knowledge can lead to change in organizational capabilities (Moshbeki, et al 2007).

OF is an important phenomenon in organizations. One strategy of successful managers for achieving and keeping competitive priority is paying attention to knowledge capitals of their staff. OF can be explained as losing organizational knowledge (intentional or accidental) (Lin & Kuo, 2007).

OF isn't a lack of ability in learning organizational subjects, but forgetting is a process which happens after learning. It means that an organization first learn knowledge and then forgets it knowingly or unknowingly. OF is the outcome of inter organizational and intra organizational actions in which an organization loses a part of the organization's present knowledge aware or unaware. This knowledge includes some cases such as skills, methods, processes, experiences, documents and techniques being used in the organization. OF is the consequence of a complex of activities which could have root in inter organizational and intra organizational actions and decisions. Organizations should look at OF systematically, aware and with plan to finally achieve some positive results (Besanko, et al., 2007).

OF has been studied mainly from two standpoints. The first standpoint sees accidental or unwanted forgetting as a degradation of the stocks of organizational knowledge. The second standpoint considers forgetting as an intentional process of unlearning preceding organizational learning (Fernandez & Sune, 2009).

OF is a powerful tool for the management of organizational knowledge by gaining appropriate knowledge and discarding the inappropriate ones. OF is necessary in organizations regarding to the turbulent environment (Jiang, et al., 2010; Bagherzadeh et al, 2010).

OF is the process of transformation from old to new knowledge within the organization (Jiang, et al., 2010).

Although the concept of OF is easy to understand, but it is not recognized well how its mechanism occurs. As OF can effect on organization competitiveness, organization needs processes to ensure that whether knowledge it is forgotten and whether knowledge is useful, it is not forgotten (Hosseini et al, 2010).

OF is a changing learning process and learning in organizational memory, one process of leaving deliberated memory and a process of destroying and rebuilding some parts of organization. In last years the OF took attention of many researchers (Jian & fu, 2010).

OF often leads a great amount of expenses on the organization and many countries spend a lot of sources annually to gain knowledge and information (Ozdemir, 2010).

OF is the challenge for managers in the new age of business. The most important subject which leads to the forgetfulness, inability to obtain and disseminate learning organization. Failure to apply the knowledge gained from learning disabilities to participate in coding and documentation, and lack of motivation for sharing knowledge, it is the most important OF (Saynder & Keming, 1998; Jalali & Khosravani, 2010).

OF is the organization's inability to accomplish some of the activities it was previously accomplishing, because of losing some of its organizational knowledge which would considerably affect its competitiveness (Moshabbeki et al., 2011).

OF is removing routines and understanding this subject that these routines would not be useful for a long time and create problems towards learning more needs of organization. OF includes process that organizational delete old regulations and behaviors by them and create opportunity for new knowledge (Akhavan and et al, 2011).

OF has been examined as loss of organizational knowledge which is not planned or intended (Easterby-Smith & Lyles, 2011).

OF is the loss of gained organizational knowledge intentionally or unintentionally. This depends on absorptive capacity of organizational memory and organization desire to become more competitive. Thus, the simple notion of organizational forgetting is the intentional or unintentional loss of organizational knowledge. This significantly affects the organization's status and competitiveness. OF is the loss of a portion of current organizational knowledge in terms of the methods, processes, expertise, documents and traditional techniques used in the organization (Esfahani et al., 2012).

OF is the loss of retained knowledge (Holland et al., 2004). It is the process of avoiding ancient unnecessary knowledge in order to acquire new knowledge (Besanko et al., 2007).

OF is a purposeful or unintentional loss of knowledge at any organizational level (Fernandez & Sune, 2009). OF is the process of transformation from old knowledge to new knowledge. In other words, OF means that the organization does consciously or unconsciously lose part of knowledge which has been previously retained (Moshabbeki et al., 2011).

OF is the organization's inability to take advantage of knowledge available in its organizational memory (Esfahani et al., 2012). It is a voluntary or involuntary loss of organizational knowledge. (Jain, 2013).

OF is an attempt for directing of values, organizational treats by use of changing the subjective structures, mental models, logical structures and main theories that direct treats, (Goudarzvand, 2014).

OF is an important and vital phenomenon that is not realized well and is not simple same learning (Jena et al, 2014).

OF means throwing away the old routine to accept the new ones. According to this definition, first, it is assumed that forgetting is an essential principle for new learning, and secondly, it has the features of targeted forgetting, thirdly, the new routine is superior to old ones. Finally, to accept that forgetting does not occur after teach (Tsang & Zahra, 2008; Salvati et al, 2014).

2.2 Organizational Forgetting Dimensions

2.2.1 Targeted Amnesia

Purposeful OF is a preliminary step to the process of organizational learning, as learning cannot happen unless there is a purposeful forgetting of the new organizational knowledge. Therefore, forgetting is a necessary process for the management of change that is no less important than functional learning in order to achieve the organization's competitive advantage (Zeng & Chen, 2010). OF can be divided into:

1. Removing old knowledge in the organizational memory deliberately or purposefully, because of being unneeded by the organization or obstacles its development. This can be achieved through the staff efforts (Fernandez & Sune, 2009; Esfahani et al., 2012).
2. The ability to acquire new and useful knowledge and keep them in the organizational memory, as this leads to the competitive advantage of the organization (HoIan et al., 2004).

2.2.2 Non-Targeted Amnesia

This kind of forgetting happens when the organization is unable to retain new knowledge in its memory system. It also happens in terms of losing knowledge stored in organizational memory with the passage of time. In this case, the OF is unintentional and is often harmful to the organization as it reduces its competitive advantage. (Holan et al., 2004) Unintentional OF can be divided into:

1. Organizational memory deterioration, or in other words forgetfulness of some of the knowledge that has been previously kept in the organizational memory. This does affect the organization's competitiveness. To face this

problem, the organization incurs substantial costs to develop its forgotten knowledge and regain its competitiveness. (Holan et al., 2004).

2. Inability to retain new knowledge in the organizational memory system. To face this problem the organization incurs substantial costs to add the new knowledge to that existing in the organizational memory. (Holan et al., 2004).

2.2 Knowledge Management

Knowledge is an organized combination of tasks, roles, procedures, and information. Organizational knowledge is not related to the organization, but it is related to the individuals who have produced it. Individuals' knowledge is the product of social interactions and is rooted in social and cultural conditions. Emphasis on individual knowledge is as important as organizational knowledge and both focuses to some extent on the nature of the tasks, the level of individual training, motivation and management desire to leave the old tasks and devolve them to lower level employees (Alvani et al,2007).

Knowledge is considered as one of the most important resources of competitive advantage. Increasing the importance of knowledge and intangible assets in the success of organizations on one hand and increasing global competition on the other hand (Akhavan et al, 2011).

In light of the above-mentioned definition, the researcher finds that knowledge in its wider sense constitutes the real wealth for each of the individuals or organizations, and it is a vital tool that helps organizations achieve their goals efficiently and effectively.

KM is a broad range of activities which is used to manage exchange, create or enhance the intellectual capital in an organization and there is not any collective agreement about what KM is. The Most basic definition of KM is finding a way to create, identify, hunt and distribute organizational knowledge to those people who need it (Abdol Karimi, 2003). KM is the knowledge-based management, connecting people to people and people to information to create competitive advantage (Nonaka, 2007).

KM is based on the idea that an organization's most valuable resource is the knowledge of its people (National Electronic Library for Health, 2008). KM is understood to be an umbrella term encompassing the many unique but related facets of knowledge-exchange, transfer and uptake among them (Dubois & Wilkerson, 2008).

KM is a procedure, process or practice to accomplish process about knowledge, process for knowledge, and process from knowledge which leads to improve the internal and external operation (Alryalat & Alhawari, 2008).

KM is a structured process with activities to capture, discover, create, filter, evaluate, store, share and apply knowledge from individuals to advance business processes and meet organization 's objectives and goals (Karadsheh, et al., 2009).

KM is a systematic and integrative process of coordinating organization wide activities of acquiring, creating, storing, sharing, diffusing and deploying knowledge by individuals and groups, in pursuit of organizational goals. KM is a human resource management exercise than a technology based discipline. It is not merely state of the art technology used to improve efficiency of the knowledge. Rather it is an exercise about how people can be motivated, best utilize their knowledge, experiences and enhance the creativity by using state of the art technology (Nonaka, 2007; Tahir, et al., 2010).

From the above-mentioned definitions, the researcher notice that there is no universally accepted definition of KM, most are extremely similar. In light of the abovementioned facts, the researcher finds that KM is a set of interrelated activities, integrated and related knowledge in terms of creation, acquisition, organization, distribution and use by all employees of the organization.

KM includes five main stages, a process of knowledge creation, knowledge acquisition, knowledge organization, knowledge distribution, and use of knowledge. This can be illustrated as follows (Wiig, 2003):

1. Knowledge Creation indicates the organization's ability to identify information needs in a scientific manner. Views and experiences are codified in order to bridge the knowledge gap between departments and divisions, in addition to providing data to solve the problems of administrative organization.
2. Knowledge Acquisition is the organization's ability to acquire knowledge, store and keep it in order to use it. This acquisition of knowledge occurs from different sources, such as similar organizations which operate in the same area, the scientific and academic institutes, libraries, the Intranet, and any other sources.
3. Knowledge Organization is the organization's ability to classify knowledge and convert it to useful written materials (knowledge base), using modern technological methods. This contributes to achieving benefits for the

organization.

4. Knowledge Distribution is the organization's ability to disseminate knowledge to the level of administrative organization, and every individual within each level of an administrative unit, whether by e-mail, meetings, training courses or other.
5. Use of Knowledge is the organization's ability to benefit from knowledge, and its circulation among all employees in order to increase functional skills, and creative abilities, which lead to improved quality of service provided by the organization to its customers.

3. Methodology

3.1 Research Model

The proposed comprehensive conceptual model is presented in Figure (1). The diagram below shows that there is one independent variable of OF. There is one dependent variable of KM. It shows the rational link between the two types of observed variables i.e. independent and dependent variables. The proposed comprehensive conceptual model is presented in Figure (1).

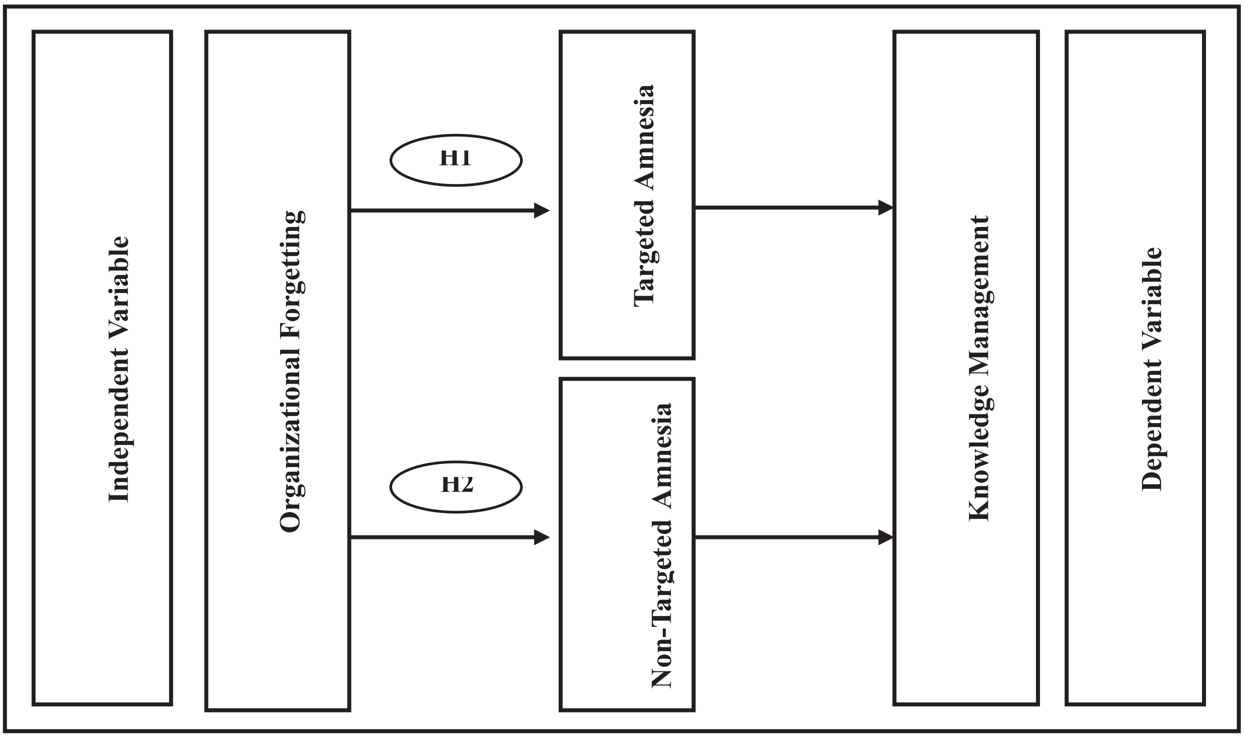

Figure 1. Proposed Comprehensive Conceptual Model

The research framework suggests that OF plays a significant role in affecting KM. In other words, there is a relationship between OF and KM. So, investigating the relationship between OF and KM is attractive to test it at the Egyptian environment.

OF is measured in terms of targeted amnesia and non-targeted amnesia (HoIan et al., 2004; Fernandez & Sun, 2009; Zeng & Chen, 2010; Moshabbeki et al., 2011; Esfahani et al., 2012).

KM as measured consisted of knowledge creation, knowledge acquisition, knowledge organization, knowledge distribution, and use of knowledge (Jakob 2003; & Wiig, 2003).

3.2 Research Questions and Hypotheses

The researcher found the research problem through two sources. The first source is to be found in previous studies, and it turns out that there is a lack in the number of literature reviews that dealt with the analysis of the relationship between OF and KM. This called for the researcher to test this relationship in the Egyptian environment. The second source is the pilot study, which was conducted in an interview with (30) employees in order to identify the relationship between OF and KM.

The researcher found several indicators; notably the important and vital role that could be played by OF. As a result of the discussions given above, the research questions are as follows:

Q1: What is the nature and extent of the relationship between OF (Targeted Amnesia) and KM at the pharmaceutical industry in Egypt.

Q2: What is the nature of the relationship between OF (Non-Targeted Amnesia) and KM at the pharmaceutical industry in Egypt.

The following hypotheses were developed to test the effect of OF and KM at the pharmaceutical industry in Egypt.

H1: OF (Targeted Amnesia) of employees has no statistically significant effect on KM at the pharmaceutical industry in Egypt.

H2: OF (Non-Targeted Amnesia) of employees has no statistically significant impact on KM at the pharmaceutical industry in Egypt.

3.3 Population and Sample

The population of the study included all employees at the pharmaceutical industry in Egypt. This sector includes five companies. They are Delta for the pharmaceutical industry, Egyptian International Pharmaceutical Industries (Eipico), Pharma Sweden, Egypt Otsu, and Egyptian Chemicals and drugs. This explains why the population of this study includes 4,783 employees. The random sampling was used for collecting the primary data as it was difficult to get all of the items of the research population because of time limitations. The stratified random sample was used while selecting items from the different categories of employees. The following equation determines the sampling size (Daniel, 1999):

$$n= \frac{N \times (Z)^2 \times P\,(1-P)}{d^2\,(N-1) + (Z)^2 \times P\,(1-P)}$$

Accordingly, the sample size has become 356 employees at the pharmaceutical industry in Egypt.

Table 1. Distribution of the Sample Size

Egyptian Pharmaceutical Companies	Employees	Percentage	Sample Size
1. Delta for the Pharmaceutical Industry	1500	31.4%	356X 31.4%= 112
2. Egyptian International Pharmaceutical Industries (Eipico)	1833	38.3%	356X 38.3% = 136
3. Pharma Sweden	850	17.8%	356 17.8% = 63
4. Egypt Otsu	350	7.3%	356X 7.3% = 26
5. Egyptian Chemicals and drugs	250	5.2%	356X 5.2% = 19
Total	4783	100%	356X 100% = 356

Source: Personnel Department at Pharmaceutical Industry in Egypt, 2015

Descriptive statistics are used to describe some of the features of the respondents at the pharmaceutical industry in Egypt who participated in the survey. Table (2) provides more detailed information about the sample and the measures.

3.4 Procedure

The goal of this study was to identify the relationship between OF and KM at the pharmaceutical industry in Egypt. A survey research method was used to collect data. The questionnaire included three questions, relating to OF, KM, and demographic information of employees at the pharmaceutical industry in Egypt. Data collection took two months. Survey responses were 80%, 285 completed surveys out of the 356 distributed.

3.5 Data Collection Tools

3.5.1 Organizational Forgetting Scale

The present study has investigated OF as an independent variable. The researcher will depend on the scale developed by HoIan et al., 2004; Fernandez & Sun, 2009; Zeng & Chen, 2010; Moshabbeki et al., 2011; and Esfahani et al., 2012 in measuring OF, which has been divided into two elements (Targeted Amnesia and Non-Targeted Amnesia).

The 19-item scale OF section is based on HoIan et al., 2004; Fernandez & Sun, 2009; Zeng & Chen, 2010; Moshabbeki et al., 2011; and Esfahani et al., 2012. There were twelve items measuring Targeted Amnesia and seven items measuring Non-Targeted Amnesia.

Table 2. Characteristics of Items of the Sample

Variables		Number	Percentage
1- Job Title	Physicians	120	42%
	Nurses	150	53%
	Administrative Staff	15	5%
	Total	**285**	**100%**
2- Sex	Male	120	42%
	Female	165	58%
	Total	**285**	**100%**
3- Marital Status	Single	100	35%
	Married	185	65%
	Total	**285**	**100%**
4- Age	Under 30	120	42%
	From 30 to 45	120	42%
	Above 45	45	16%
	Total	**285**	**100%**
5- Educational Level	Secondary school	100	35%
	University	150	53%
	Post Graduate	35	12%
	Total	**285**	**100%**
6- Period of Experience	Less than 5 years	100	35%
	From 5 to 10	130	46%
	More than 10	55	19%
	Total	**285**	**100%**

The survey form is used as the main tool for data collection in measuring OF at the pharmaceutical industry in Egypt. Responses are categorized using a 5-point Likert Scale for each statement, ranging from (1) "very ineffective", (2) "ineffective", (3) "neither effective nor ineffective", (4) "effective", and (5) "very effective".

3.5.2 Knowledge Management Scale

The researcher will depend on the scale developed by Jakob (2003) and Wiig (2003) in measuring KM, which has been divided into five main components (knowledge creation, acquisition, organization, distribution, and use of knowledge).

This measure consists of 25 statements: five statements for knowledge creation, five statements for knowledge acquisition, five statements for knowledge organization, five statements for knowledge distribution, and five statements for use of knowledge. The survey form has been used as a key tool to collect data to measure KM at the Pharmaceutical industry in Egypt.

KM has been measured by the five- item scale of Likert of agreement or disagreement where each statement has five options.

The informant should select the answer that suits his choice, where (5) indicates full agreement while (1) indicates full disagreement, with neutral degrees in- between.

3.6 Data Analysis

For purposes of the statistical analysis and hypotheses testing, the researcher has employed the following methods:

1. The Alpha Correlation Coefficient (ACC), which aims at verifying the degree of reliability in the scale of OF and KM.
2. The Multiple Regression Analysis (MRA), which aims at verifying the type and strength of the relationship between OF as independent variables and KM as a dependent variable.
3. The statistical testing of hypotheses which includes F- test and T-test which go hand in hand with the MRA. All these tests accompany analysis means which are to be used. They are found in SPSS.

4. Hypotheses Testing

4.1 Evaluating Reliability

Before testing the hypotheses and research questions, the reliability of OF and KM were assessed to reduce errors of measuring and maximizing constancy of these scales. To assess the reliability of the data, Cronbach's alpha test was conducted.

Table (3) shows the reliability results for OF and KM. All items had alphas above 0.70 and were, therefore, excellent, according to Langdridge's (2004) criteria.

Table 3. Reliability of OF and KM

Variables	The Dimension	Number of Statement	ACC
OF	Targeted Amnesia	12	0.857
	Non-Targeted Amnesia	7	0.884
	Total Measurement	**19**	**0.711**
KM	Knowledge Creation	5	0.915
	Knowledge Acquisition	5	0.653
	Knowledge Organization	5	0.811
	Knowledge Distribution	5	0.856
	Use of Knowledge	5	0.886
	Total Measurement	**25**	**0.925**

Regarding Table (3), the 19 items of OF are reliable because the ACC is 0.711. Targeted Amnesia, which consists of 12 items, is reliable because the ACC is 0.857. Non-Targeted Amnesia, which consists of 7 items, is reliable because the ACC is 0.884. Thus, the internal consistency of OF can be acceptable.

According to Table (3), the 25 items of KM are reliable because the ACC is 0.925. Knowledge creation, which consists of 5 items, is reliable because the ACC is 0.915. Knowledge acquisition, which consists of 6 items, is reliable because the ACC is 0.653. Furthermore, knowledge organization, which consists of 5 items, is reliable because the ACC is 0.811. Knowledge distribution, which consists of 5 items, is reliable because the ACC is 0.856. Use of knowledge, which consists of 5 items, is reliable because the ACC is 0.886. Thus, the internal consistency of KM can be acceptable.

Accordingly, two scales were defined, OF (19 variables), where ACC represented about 0.711, and KM (25 variables), where ACC represented 0.925.

4.2 Correlation Analysis

The researcher calculated means and standard deviations for each variable and created a correlation matrix of all variables used in hypothesis testing. Arithmetic mean and standard deviation values related to dependent and independent variables of this study and correlation coefficients between these variables are given in Table (4).

Table 4. Descriptive Statistics and Correlation Matrix of Constructs

Variables	Mean	Std. Deviation	1	2	3
1. Targeted Amnesia	3.06	0.862	1		
2. Non-Targeted Amnesia	3.01	0.777	0.394 **	1	
3. Knowledge Management	3.58	0.775	0.808 **	0.405 **	1

Note: ** Correlation is significant at 0.01 level

According to Table (4), the first issue examined was the different facets of OF. Among the various facets of OF, those who responded identified the presence of Targeted Amnesia (M=3.06, SD=0.862). This was followed by Non-Targeted Amnesia (M=3.01, SD=0.777).

The second issue examined was the different facets of KM (knowledge creation, knowledge acquisition, knowledge organization, knowledge distribution, and use of knowledge). Most respondents identified the overall KM (M=3.58, SD=0.775).

According to Table (4), OF dimensions have a significant relation with KM. The correlation between OF (Targeted Amnesia) and KM is 0.808. For OF (Non-Targeted Amnesia) and KM, the correlation value is 0.405.

Finally, Table (4) proves that there is a significant correlation between OF and KM. So our hypothesis is supported and it can be said that there is a significant and correlation between OF and KM.

4.3 Organizational Forgetting (Targeted Amnesia) and KM

The relationship between OF (Targeted Amnesia) and KM at the pharmaceutical industry in Egypt is determined. The first hypothesis to be tested is:

There is no relationship between OF (Targeted Amnesia) and KM at the pharmaceutical industry in Egypt.

Table 5 proves that there is a relationship between OF (Targeted Amnesia) and KM at significance level of 0,000.

As a result of the value of R^2, the 12 independent variables of Targeted Amnesia can explain 76% of the total differentiation in KM level. For the results of a structural analysis of the MRA, the direct effect of OF (Targeted Amnesia) and KM is obtained. Because MCC is 0.872, it is concluded that there is enough empirical evidence to reject the null hypothesis.

Table 5. MRA Results for OF (Targeted Amnesia) and KM

The Variables of OF (Targeted Amnesia)	Beta	R	R^2
1. The possibility of change lies in the cognitive abilities of workers.	0.086 *	0.116	0.013
2. The possibility of change lies in the laws and regulations that govern work in the organization.	0.060	0.490	0.240
3. There is relative stability in service delivery methods, in the short term.	0.142*	0.657	0.431
4. There is a tendency to continue actions being performed without any change in working methods.	0.020	0.247	0.061
5. Possibility of change is available in the organizational culture on a regular basis.	0.086	0.326	0.106
6. There is a possibility of change in the organizational structure.	0.097*	0.665	0.442
7. The knowledge capacity of workers is utilized in order to make fundamental changes in the organization.	0.302 **	0.673	0.452
8. Internal innovation is often used to assess or develop services.	0.022	0.605	0.366
9. always walk or consistency on effective ways that lead to success.	0.246 **	0.766	0.586
10. The ability to change the working methods of the organization is available.	0.088*	0.511	0.261
11. Working methods that previously led to failure are avoided.	0.242 **	0.706	0.498
12. There is no culture of fear of leaving the old unsuccessful methods of work.	0.170*	0.323	0.104
▪ MCC		0.872	
▪ DC		0.760	
▪ Calculated F		71.913	
▪ Degree of Freedom		12, 272	
▪ Indexed F		1.75	
▪ Level of Significance		0.000	
** P < 0.01 * P < 0.05			

4.4 Organizational Forgetting (Non-Targeted Amnesia) and KM

The relationship between OF (Non-Targeted Amnesia) and KM at the pharmaceutical industry in Egypt is determined. The second hypothesis to be tested is:

There is no relationship between OS (*Non-Targeted Amnesia*) and KM at the pharmaceutical industry in Egypt.

As Table (6) proves, the MRA resulted in the R of 0.563. This means that KM has been significantly explained by the 7 independent variables of OF (Non-Targeted Amnesia).

Furthermore, the R^2 of 0.317 indicates that the percentage of the variable interprets the whole model, that is, 32%. It is evident that the seven independent variables justified 32% of the total factors of KM.

Hence, 68% are explained by the other factors. Therefore, there is enough empirical evidence to reject the null hypothesis.

Table 6. MRA Results for OF (Non-Targeted Amnesia) and KM

The Variables of OF (Non-Targeted Amnesia)	Beta	R	R^2
1. External innovation is often adopted to provide or develop services.	0.093	0.346	0.119
2. Losing of knowledge stored in databases leads to serious results.	0.508*	0.421	0.177
3. Dates of the training programs of personnel development are often spaced.	0.597 **	0.133	0.017
4. Knowledge gained by employees from the training programs is not used.	0.327 **	0.185	0.034
5. Workers who have knowledge often leave the organization unexpectedly.	0.216	0.343	0.117
6. There is a decrease in the number of times of using the existing knowledge of workers.	0.004	0.417	0.173
7. Work methods are often changed without drawing on previous experiences.	0.047	0.380	0.144
▪ MCC		0.563	
▪ DC		0.317	
▪ Calculated F		18.405	
▪ Degree of Freedom		7, 272	
▪ Indexed F		2.01	
▪ Level of Significance		0.000	
** P < 0.01 * P < 0.05			

5. Results

1. There is a statistically significant relationship between OF and KM at the Pharmaceutical industry in Egypt. In other words, there is a relationship between OF (Targeted Amnesia) and KM at significance level of 0,000. The Twelve independent variables of Targeted Amnesia can explain 76% of the total differentiation in KM level according to R^2. The direct effect of OF (Targeted Amnesia) and KM is obtained because MCC is 0.872. In other words, OF has impact on organizational performance by influencing on KM. This direct impact has been confirmed by results of other researchers (Kransdorff, 1998; Bhatt, 2002; Lehesvitra, 2004; Besanko et al, 2007; Santos-Vijande et al, 2011; Ho, 2011; Lin & Kuo, 2013).
2. There is a negative relationship between OF and KM at the Pharmaceutical industry in Egypt. The MRA resulted in the R of 0.563. This means that KM has been significantly explained by the seven independent variables of OF (Non-Targeted Amnesia). The R^2 of 0.317 indicates that the percentage of the variable interprets the whole model, that is, 32%. It is evident that the seven independent variables justified 32% of the total factors of KM. Hence, 68% are explained by the other factors. In other words, results of this research show that OF has effect on KM in this organization and has negative effect on organizational performance. The results are consistent with research conducted by Dierickx & Cool, 1989; De Carolis & Deeds, 1999; De Holan and Philips, 2003; De Holan and Philips, 2004a, 2004b; Lin & Kuo, 2007; Ku, 2011; Tabarsa & Mirzadeh, 2012; Hezarkhani, 2014.

6. Recommendations

1. Managers at the pharmaceutical industry in Egypt should develop their KM in order to improve their organizational performance. This improvement will be obtained when learning process had been done through OF.
2. Organizations should attain the level of adequacy in which they are able to forget useless and ineffective knowledge before learning new useful knowledge. OF can bring considerable expenses for organizations but it should be managed in order to be successful in organizational performance improvement. So, OF is a weakness in utilizing previous knowledge and experiences.
3. Managers at the pharmaceutical industry in Egypt should put telling leadership style aside in organizations so that the positive outcomes of strategic OF help organizations reach their policies.
4. Managers at the pharmaceutical industry in Egypt should start presenting appropriate explanation and reinforcing employees and encourage them to do a planned and knowing effort to review their strategic orientations so that employees forget a part of their knowledge for more efficiency of the organization.
5. Managers at the pharmaceutical industry in Egypt should help employees to recognize bad habits, instructions. Deeds, beliefs and values, which are harmful for the effectiveness, by creating mutual relations and cooperation based on trust so that they forget such knowledge before stabilizing and institutionalizing in organizational memory.
6. It is necessary that forgetting process is managed well so that the former information, which is barrier for beneficial changes, removes from organizational memory. So, leaders should give employees the authority to set aside inefficient and old thoughts so that they could apply better new methods.
7. Organizations must undertake effective knowledge management, try to avoid forgetting them, and identify unnecessary knowledge to remove it. This will help maintain the size of organizational memory that leads to the development of employees and competitiveness of the organization.
8. Organizations must manage the processes of learning and forgetting well, because learning is one of the intangible resources that lead to the functional capacity of employees. The organization doesn't learn to increase its capabilities, but also to forget some unnecessary knowledge in order to take into account the size organizational memory and in the case of the acquisition of new and useful knowledge.
9. Organizations must increase the effectiveness of purposeful OF, in terms of removing the old knowledge on the one hand, and the ability to acquire new knowledge on the other , in order to make access to the best knowledge that will help the organization to keep pace with environmental and technological changes and developments. This would result in maintaining competitiveness of the organization.
10. The organization should develop mechanisms which help it avoiding and treating unintentional OF represented in losing of knowledge which previously retained, on the one hand, and the inability to retain new knowledge, on the other. This significantly affects the functional capacities of the organization's employees.

7. Conclusion

Today is the age of changes. KM is important for competitiveness. Hence, due to knowledge dynamism, its keeping becomes more important. Sometimes, organizations are forced to forgetting on order to generate and keep the knowledge to replace a newer learning. The present paper aims ate studying the relationship between OF and KM. Findings suggest that there is a significant relationship between OF and KM. When the importance of KM process is added, the importance of OF is also added.

KM is one of the most important organizational components which need to establish a system for learning, gathering, stocking and distributing the knowledge inside an organization. In addition to disseminating organizational learning, this system should be able to prevent necessary and fruitful knowledge forgetting on the one hand and to put aside unfruitful knowledge (OF) on the other hand. Despite of needs to develop organizational learning capabilities, studies indicate that organizations do not learn easily.

Overall, when organizations manage their knowledge capacities, organizational learning ground is paved and it is likely to see OF. When organizations can manage OF actively, they will be able to avoid bad habits as well unnecessary and surplus knowledge which would impact on their position against their rivals.

The conclusions of this research are divided into three pivots. The first pivot deals with the conclusions related to cognitive side, the second contains the conclusions related to the business environment, and the third is the conclusions of the application. These conclusions can be dealt with as follows:

7.1 Conclusions Related to the Cognitive Side

There is a set of conclusions related to the cognitive side, in general. These conclusions are:

7.1.1. Scarcity of research focusing on investigation and interpretation of the relationship between the variables of current research in the business environment, specifically in the Egyptian organizations.

7.1.2. OF is expressed by a range of organizational dimensions such as (purposeful OF, Unintentional OF) which can be used to measure the level of OF at any organization.

7.2 Conclusions Related to Business Environment

Results of the analysis showed the presence of a set of conclusions directly related to the business environment, namely:

7.2.1. OF arises in any regulatory environment in which knowledge is available. Besides, OF plays an important role in influencing the competitiveness of the organization.

7.2.2. The OF is a key factor to create an organizational environment that can be developed or degraded. This depends on the OF type whether it is purposeful or unintentional.

7.2.3. Functional learning and innovation are among the factors which may contribute in development or deterioration of various functions within the organization.

7.2.4. Well management the OF process in terms of identifying the type of forgetting, whether purposeful or unintentional, will be reflected in the development or deterioration of various functions within the organization.

7.2.5. Well management of knowledge would help the organization to deal with the competitive environments conditions, on the one hand, and the achievement of organizational objectives on the other.

7.3 Conclusions Related to Applied Side

Results of the analysis showed the presence of a set of conclusions related to the applied aspect of the current search, namely:

7.3.1. Purposeful OF has a significant impact on the organization. This indicates that the Egyptian organizations must adhere to OF through (1) removing the unneeded old knowledge in memory (2) the ability to acquire new knowledge and keep them in organizational memory. This leads to reduce deterioration of the capabilities of learning and functional innovation in these organizations.

7.3.2. Unintentional OF has a significant impact on deterioration of functional learning and innovation. This indicates that the Egyptian organizations under study have the obligation to develop a set of mechanisms that help in reducing the spread of this phenomenon of negative results for the organization, namely (1) losing knowledge that has been retained in the organizational memory, (2) inability to retain new knowledge in organizational memory. Facing these problems will help the organization developing the process of functional learning and innovation.

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FDI and the Subprime Crisis: An Analysis for Asian and Latin American Countries

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Abstract

In recent decades, the inflows and stocks of foreign direct investment (FDI) have been heading increasingly towards developing countries intensifying the dynamics of international business. However, in 2008 the international financial crisis hit the world economy, decreasing FDI levels on a global scale. In this context, the purpose of this study is to evaluate the impact of the international financial crisis on FDI in Asian and Latin American countries, and to accomplish that, an analytical model was estimated by using dynamic panel procedures. Among the results, it was observed that the 2008 crisis had a negative impact on the multinational companies affecting the FDI stocks in the countries under consideration. However, the impact on the two regions differed, as the reduction in FDI stocks in Asia was greater than that in Latin American countries. In addition, the extension of the crisis, after 2008, was favorable to the growth of FDI in both regions.

Keywords: Asian countries; dynamic panel; financial crisis; foreign direct investment; Latin American countries; multinational companies

1. Introduction

Recently, the view that foreign direct investment (FDI) can benefit developing countries through modernizing and developing their economies has been disseminated. There is both empirical and theoretical evidence that FDI can contribute to economic growth by increasing competition among firms and improving a country's technological capacity, which, in turn, raises the levels of employment (Herman, Chisholm & Leavell, 2004; Blomström & Persson, 1983). The favorable relationship between FDI and national economic performance is linked to a country's capacity to absorb these capital advantages. This capacity is determined by economic and institutional factors, such as economic growth, the financial system's level of development, human capital quality, quality of infrastructure, and regulation of capital input (Dunning, 1988; Borensztein, De Gregorio & Lee, 1998; Alfaro & Chen, 2010).

In recent decades, the flow of FDI into developing countries has increased significantly. These countries received only 16% of the total FDI inflow in the early 1990s, with this share increasing to 34% in the middle of that decade and reaching 54% of total inflow in 2012 (UNCTAD, 2015). However, this inflow of FDI to developing countries varies significantly between regions. Among the emerging countries, the Asian countries, especially the East and Southeast Asian countries, followed by the Latin American countries, stand out as the main investment inflow recipients. African countries and other Asian and Oceanic countries are less relevant in this context, as shown in Figure 1.

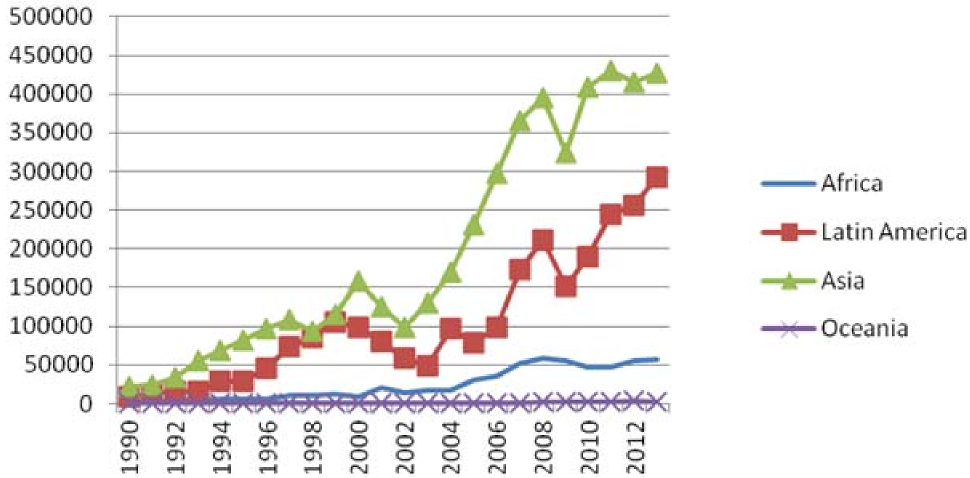

Figure 1. FDI inflows to developing countries from 1990 to 2013, US$ millions

Source: UNCTAD, 2015.

Among the Asian emerging markets, East Asia (especially China) and Southeast Asia are the main sub-regions receiving FDI. From 2000 to 2005, these sub-regions received about 80% of the FDI inflows into Asian developing countries, accounting for almost 85% of the investment stock (UNCTAD, 2005). A more attractive environment for FDI in these regions seems to have been created by the growth of these economies in the 1990s, including the Chinese economic expansion and dynamism, taken in association with other factors, such as cheap and high-quality labor, high levels of education in some countries (e.g., South Korea), tight integration with the global economy, and institutional reforms in favor of market functioning (Hsieh & Hong, 2004; Barros, Chen & Damasio, 2013).

In Latin America, participation in the total FDI inflows was only 5% in the late 1980s, accounting for only 5% of the investment stock worldwide. This situation has changed since the mid-1990s, with the region recording share in total FDI inflows of up to 12%, reaching 7% of the world's capital stock (UNCTAD, 2005). The reasons for this increase in the attractiveness of FDI include the trade-liberalization process in the region/countries; the creation of regional trade agreements, such as NAFTA (North American Free Trade Agreement) and MERCOSUR; the privatization process; and the macroeconomic and institutional changes in key Latin American countries (Amal & Seabra, 2007; Penfold, 2014).

There was a marked drop in FDI inflows by the end of 2008, when the world economy began to feel the effects of the global financial crisis that had started with the subprime crisis in the US market. This crisis also had negative effects on capital, production, employment, and trade across the world (Alfaro & Chen, 2010). With regard to FDI, there was a generalized drop in stocks and flows, mainly between 2008 and 2009. During this period, the global inflow of FDI fell by 33%, while stocks fell 14%. In the developed economies, flows declined by 40% and stocks declined by 16%, on average, whereas, in the developing countries, the declines were 21% and 6%, respectively (UNCTAD, 2015).

Since 2010, however, several developing countries, such as China, Brazil, and India, have started to show signs of improvement in their economic performance. On the other hand, the developed countries have been facing the financial crisis, which has unfolded and caused a public deficit crisis in the European Union (EU). This is regarded as an extension of the subprime crisis. Also, since 2010, the growth of global FDI inflows has resumed in some areas, albeit at levels below those prior to the start of the crisis. In Asian emerging countries and in Latin America, FDI levels have increased above their levels at the beginning of the crisis (see Figure 1).

FDI inflows over the decades of 1990 and 2000 increased worldwide and were increasingly aimed at developing countries, especially East/Southeast Asia and Latin America. Nevertheless, the erupting financial crisis (subprime) seems to have stopped this expansion briefly (at the beginning of the crisis) and may have favored the subsequent attraction of FDI to the countries concerned (when considering the expansion of the crisis in the European countries).

The literature on this subject shows that most studies of the subprime financial crisis and FDI involved qualitative analysis, reporting the possible causes and effects of investment fluctuations during the period and drawing comparisons with past crises (Poulsen & Hufbauer, 2011; Ramamurti, 2011; UNCTAD, 2010). Overall, these studies show that the crisis led to a decline in FDI in both developed and developing countries due to the risks and uncertainties associated with the fragility of the global economy (UNCTAD, 2010).

Few empirical studies, however, have dealt with the relationship between the recent financial crisis and FDI levels in developing countries. Ucal, Özcan, Bilgin and Mungo. (2010) demonstrated this relationship by analyzing a semi-parametric model of whether the FDI inflows were affected in the periods before and after the international financial crisis (subprime). The model results indicated that FDI inflows in the developing countries fell in the years after the crisis, i.e., after 2008, whereas they grew considerably in the years before 2008. However, this study was limited to analyzing data until 2011, and it neither differentiated regions involving the emerging countries nor explained the reasons for fluctuations in FDI. As previously reported, the developing countries are quite heterogeneous in terms of attracting FDI.

Thus, this study aims to evaluate the impact of the international financial crisis (subprime) by considering its influence on FDI in the Asian and Latin American emerging countries during 1995–2014. This involves an issue that has been poorly addressed in the literature, as there is no defined theoretical framework and there are few empirical contributions. Furthermore, it is still important to understand the effects of the international financial crisis on FDI and the consequent effects on various aspects of the world economy. For many developing countries FDI compensates for the lack of domestic private investments, and it is associated with potential benefits for national economies (UNCTAD, 2010). In addition, the findings of this study may also be useful for comparisons with other regions and countries that attract large amounts of FDI.

Following this introduction, the article is divided into four sections. The background section discusses some effects of financial crises and their relationship with FDI, especially in the subprime crisis. The methodology section describes the analytical model, data sources, and econometric procedures. Econometric model results and discussions are presented in the fourth session. Finally, the conclusion section emphasizes the study's contributions and its implications.

2. Background: Financial Crises and Their Relations with FDI

Until 2008, very few financial crises had occurred in the developed economies, and absolutely none at all occurred from World War II until 1970s. In the emerging markets, the frequency of financial crises have escalated through the 1970s, 1980s and especially 1990s, due to increasing financial deregulation in their economies (Taylor, 2012). Considering financial crises against this background opens up broader concepts. According to Goldsmith (1982), financial crises are linked to a sharp, brief, and ultra-cyclic deterioration of financial indicators, such as asset prices, credit, short-term interest rates, and financial institution collapse. According to Kindleberger and Aliber (2005), crises are, in general, related to economic cycle peaks that occur during a period of economic growth, leading to a period of depression. Crises can be of either domestic or foreign origin, can start in either the private or the public sector, with different forms and intensities, and can spread swiftly across borders (Claessense & Kose, 2013; Reinhart & Rogoff, 2009).Despite both the complexity of financial crises and the differences between them, they tend to have similarities in terms of macroeconomic and financial consequences, as these go beyond the uncertainty they create. Often, financial crises involve significant changes in the credit volume; severe disruptions in financial intermediation, especially in foreign credit supply; impacts on the currency and the exchange rate, consequently, serious problems with the balance of payments; and need for massive governmental support. In addition, financial variables such as credit and asset prices tend to either fall or grow less in periods of turbulence (Claessense & Kose, 2013). In addition, at the level of firms, studies show that financial crises are associated with sharp reductions in R&D, employment, and investments in general, which leads companies to lose growth opportunities (Campello, Graham & Harvey, 2010).

Growth prospects are increasingly harmed as financial crises evolve into economic crises (ECLAC, 2009). In this sense, investment levels tend to be affected to a large scale in times of crisis through several interrelated and mutually influenced channels: credit crush, economic growth reduction, and increased uncertainty, which leads investors to be more cautious and to postpone their investments (Minsky, 1986; Joyce & Nabar, 2009).

FDI is a type of investment that allows an investor resident in another economy to either exert control over or significantly influence enterprise management (OECD, 2008). FDI is a result of medium- and long-term decisions and is not usually affected over the short term. The FDI response to crises and turbulence can be less significant than is the response of speculative capital, which is more volatile, and may exhibit a lag that will be perceived in periods after the crisis bursting (ECLAC, 2009; UNCTAD, 2010). Planned or future transnational investments may be affected by pessimistic crisis situations, depending on the severity, extent, and type of crisis.

However, it is believed that investments already in progress are still implemented and finalized when a crisis erupts. In this sense, studies on the relationship of the Asian crisis (1997) and the Mexican crisis (1994) to foreign investment showed an FDI behavior that was more stable than other types of investment, such as portfolio (Athukorala, 2003; Lougani & Razin, 2001; Lipsey, 2001; Krugman, 2000; Graham & Wada, 2000).

However, FDI may fall in crisis situations, despite being more stable than other types of investment. Credit conditions and growth prospects, as well as the economic, political, and business environment, are factors that influence the investment decisions of transnational corporations: thus, they are FDI determinants (Dunning, 1988; Blonigen, 2005). If the crisis spreads, and these factors are affected, the probability of a decline in FDI also increases. That is, despite being a less volatile investment type, FDI can be hit by an overall financial crisis through its determinants.

When considering the crisis and post-crisis periods, it can be seen that FDI levels may even increase (Krugman, 2000; Athukorala, 2003). Due to currency depreciation, demand contractions and financial collapse can cause a decrease in the domestic asset price. This favors the so-called asset-seeking strategy of transnationals (Note 1), as there is an investment cost reduction in assets and enrichment in terms of market power. Also, as an economic recovery measure, many governments may adopt more liberal policies relating to foreign capital, which can open new opportunities for mergers and acquisitions (Krugman, 2000). This is the fire-sale hypothesis, developed by Krugman (2000), which is based on the financial crisis among the Asian Tigers in the late 1990s.

Thus, it is clear that FDI is seen in the literature as a more stable investment type, although it may suffer falls during crises, and as less expressive than other types of investment, such as portfolio. Also, financial crises tend to impact the FDI level by affecting its determinants, especially factors related to macroeconomic and institutional performance. Furthermore, FDI can be critical to the economic recovery of countries in post-crisis periods.

2.1 The Subprime Crisis

The recent international financial crisis, the greatest crisis since the 1929 Great Depression, was generated from 2007 to 2008 by the subprime crisis in the US market and soon expanded into the world economy. Generally speaking, this financial crisis originated in the USA with subprime mortgages and their subsequent default. In short, the low interest rates and good financing conditions in the 1990s made many people buy real estate and borrow what they could, with banks even lending to high-risk customers (at higher interest rates). With an increase in the US interest rates and a slowing economy, defaults had been increasing since 2001. As the fund bonds were negotiated by various financial institutions, the solvency crisis spread in the US financial system and later in the global financial system, resulting in the emergence of the crisis on the public stage in mid-2008 (Allen & Carletti, 2009).

The crisis led to a collapse of the large commercial and investment banks (e.g. Lehman Brothers, Bear Sterns, and Merrill Lynch); a significant decline in stock prices, followed by marked loss of confidence in this market, a large increase in unemployment, and a fall in production in various countries (Mello & Spolador, 2010). The advance of the crisis eroded the prospects for economic growth, one of the key drivers of FDI, as it limited access to internal and external financial resources and increased uncertainty, thereby increasing the risk for investors (Poulsen & Hufbauer, 2011; ECLAC, 2009).

The extension of the subprime crisis hit the European market and led to a public deficit crisis in the EU. In general, there was a transfer of the real estate debt bubble to public debt as an emergency measure to save the European financial systems. However, this measure compromised the accounts of many countries by increasing public debt, particularly in Greece, Portugal, Spain, Italy, and Cyprus. Consequences of the European crisis included political problems in the EU framework; reduced credit in the most affected countries; high unemployment rates; recession, or low growth of gross domestic product (GDP); popular dissatisfaction; and capital and investment outflow (Mongelli, 2013).

During the crisis, the global FDI stocks fell from US$18 trillion in 2007 to US$15 trillion in 2008 (UNCTAD, 2015). Investment inflows fell by 16% in 2008 and inflows fell by 33% in 2009, when the global economy contracted. This decrease was more significant in developed economies, reaching 40%, on average, and 21% in the developing countries (UNCTAD, 2015). At the firm level, financial crisis imposes liquidity restrictions on transnational corporations, limits access to credit, and promotes more cautious behavior by managers, who may restrict large infrastructures and risk projects (Polsen & Hufbauer, 2011).

In Latin America, the overall drop in FDI inflows was approximately 41% between 2008 and 2009, although this figure excludes financial centers. The investment stock in the region fell from US$ 980 billion in 2007 to

US$ 930 billion in 2008, a decrease of 5% (UNCTAD, 2015). However, in 2010, the FDI levels grew again in Latin America and the Caribbean, and the region attracted about US$ 125 billion in FDI, 40% more than in 2009.

In Southeast Asia, the crisis led to a drop in FDI in 2008, when the investment retreated by 42% over the previous year. In East Asia, this drop in inflows was 17% between 2008 and 2009. The reduction in inflows also affected the stock investment level in the sub-regions in question; these decreased from US$ 2.40 trillion in 2007 to $ 2.1 trillion in 2008—a reduction of 12% (UNCTAD, 2015). Nevertheless, in 2010, despite these effects of the crisis, the East and Southeast Asia attracted US$ 330 billion in FDI—34% more than in 2009—thereby raising investment stocks to $ 3.1 trillion.

The falls and recoveries in FDI flows and stocks in these regions can be seen in Figures 2 and 3.

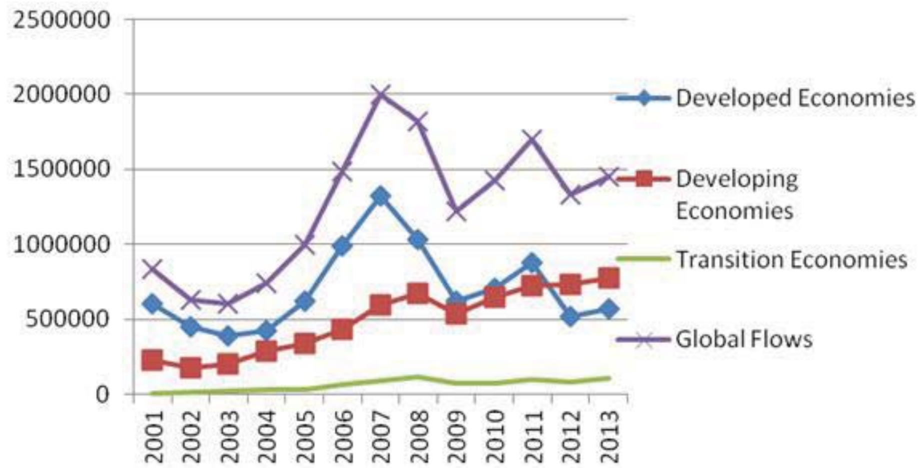

Figure 2. Global FDI inflows from 2001 to 2013, US$ millions

Source: UNCTAD, 2015.

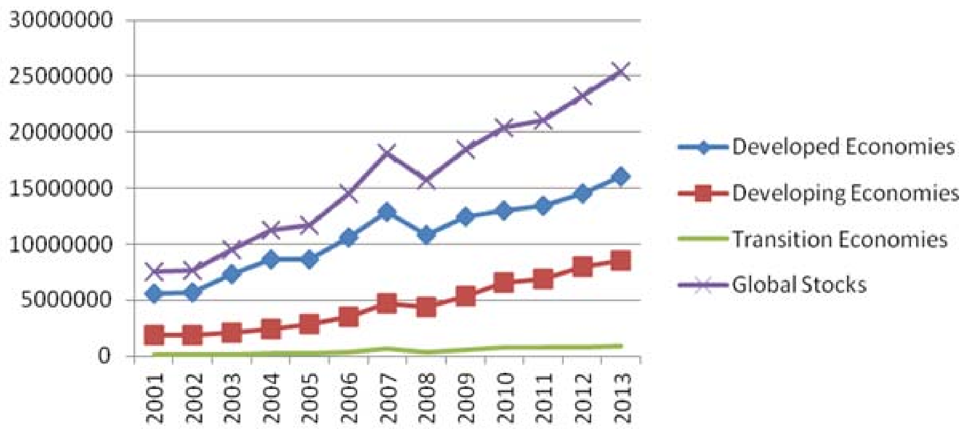

Figure 3. Global FDI stocks from 2001 to 2013, US$ millions

Source: UNCTAD, 2015.

3. Analytical Model and Data Sources

Several locational factors, such as macroeconomic, institutional, and social features, can attract FDI into a country or region (Dunning, 1988). Similarly, external factors (e.g. financial crises) can impact the FDI levels assigned to a particular location. To capture these effects, this study will follow a version of the partial adjustment model, which is widely used in the literature on FDI (Love & Hidalgo, 2001; Blattner, 2006). According to this model, the current FDI stock in the country i in year t is explained by stock investment in the last period and several other independent variables. This resulted in the following model (Note 2):

$$FDI_{i,t} = \delta FDI_{i,t-1} + \beta_0 + \beta_1 LATIN_{i,t} + \beta_2 CRISIS08_{i,t} + \beta_3 EXTCRISIS_{i,t} + \beta_4 CRISIS08XLATIN_{i,t} + \beta_5 EXTCRISISXLATIN_{i,t} + \beta_6 GDP_{i,t} + \beta_7 OPEN_{i,t} + \beta_8 ER_{i,t} + \beta_9 INF_{i,t} + \beta_{10} PINVEST_{i,t} + \beta_{11} GOVSTAB_{i,t} + \beta_{12} CORRUP + \beta_{13} CRISES90_{i,t} + \varepsilon_{it} \quad (1)$$

The subscript i shows the Latin American (Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, Mexico, Panama, Paraguay, Peru, Uruguay, and Venezuela) or Asian (China, Hong Kong, South Korea, Singapore, Thailand, Malaysia, Indonesia, Philippines, and Vietnam) countries, and the subscript t indicates the analysis period (in years) covering 1995–2014. To elect this set of explanatory variables, information contained in empirical studies (Amal & Seabra, 2007; Montero, 2008; Liu, Chow & Li, 2006; Hsieh & Hong, 2004) on the attractiveness of FDI in Latin American and Asian countries is used. All variables are treated as natural logarithm (ln) to capture their elasticity. β_0 is the model constant.

FDI is the natural logarithm (ln) of FDI stocks in US$ million. It was decided to use FDI stocks in the model, primarily because the partial adjustment model uses stocks. Also, FDI stocks are the result of investment flows accumulated over previous years. Additionally, the transnational corporations and a country's productive capacity are associated with investment stocks.

When following the partial adjustment model, $FDI_{i,t-1}$ is the FDI stocks lagged in one period, and, one can calculate the adjustment coefficient ξ from δ (Note 3). It is believed that the lagged FDI stock has a positive and statistically significant relationship with the dependent variable, implying that the existing FDI attracts more FDI.

LATIN is a dummy variable that is included in the model to distinguish the Latin American countries (Latin = 1) from the Asian ones (Latin = 0). This dummy variable aims to capture the heterogeneity between the two regions in terms of FDI attraction. A statistically significant coefficient is expected from this dummy variable, as it implies that there are differences in the FDI levels between countries in the two regions.

CRISIS08 is a dummy variable representing the international financial crisis in 2008, when there was a drop in FDI stocks worldwide, especially in Asian and Latin American countries (see Figures 2 and 3). As pointed out by Kaminsky (2006), financial crises are characterized mostly by a variety of weak economic fundamentals, indicating that it would be difficult to define them in an applied model as just a proxy or an economic variable. Thus, it was decided to express the recent financial crisis in terms of its outbreak period in the world market and of shocks on FDI stocks, defining CRISIS08 = 1 in 2008 and CRISIS08 = 0 in the other years.

CRISIS08XLATIN, which is the iteration between dummy variables LATIN and CRISIS08, distinguishes the effect of the financial crisis in 2008 on the Latin American countries. In this case, the iteration CRISIS08XLATIN allows testing of the null hypothesis that the effects of the financial crisis on FDI stocks are independent of the group of countries (whether Asian or Latin American). When there is iteration between dummy variables, CRISIS08 represents the average effect of the crisis on Asia countries. If the iteration CRISIS08XLATIN is statistically significant, we reject the null hypothesis, which means that the average effect of the 2008 financial crisis on Latin American countries differed from that on Asian countries. This evidence indicates that the financial crisis has negatively impacted the FDI in both regions. However, it is expected that this negative effect is distinct, due to the heterogeneity of FDI-determining factors and the vulnerability to crisis in each region.

EXTCRISIS is a dummy variable aimed at capturing the effect of the subprime crisis extension, or the second wave of crisis contagion, on FDI levels in the countries in question. To define this variable, it is considered that the subprime crisis and its effects on FDI were not limited to 2008. EXTCRISIS takes the value 1 for all countries from 2009 to 2012 and takes the value zero for the other years. This is the period of spread of the initial crisis, especially in the developed countries, causing the public deficit crisis in the EU.

The iteration EXTCRISISXLATIN allows testing of the null hypothesis that the effects of the financial crisis extension on FDI stocks are independent of the group of countries (whether Asian or Latin American). Thus, EXTCRISIS expresses the average effect of the crisis extension on the FDI levels in Asian countries. Being statistically significant, the coefficient EXTCRISISXLATINA represents the average difference in the impact of the crisis extension on FDI levels in Latin American countries. It is believed that, in both regions, the crisis extension period was favorable to direct investment attraction due to the restructuring of these economies, implementation of counter-cyclical policies, and spread of the crisis to the developed countries.

CRISES90 is a dummy control variable used in the model to capture the shock to FDI stocks that occurred between 1997 and 2001, considering the possibility of structural breaks. This period was marked by a series of financial crises in the developing countries, the so-called crises in emerging markets (Asian Tigers Crisis in 1997;

Russian Crisis, 1998; Brazilian Foreign Exchange Crisis, 1999; and Crisis in Argentina, 2001), and the US recession after terrorist attacks. It was stipulated that CRISES90 = 1 for 1997–2001, a period when there were sharp fluctuations in FDI stocks in Latin American countries and, especially, in Asian countries, whereas CRISIS90 = 0 for the remaining years.

The other variables expressed in β6 to β12 are also used as controls in the model and are related to possible economic and institutional FDI determinants, according to the literature (Amal & Seabra, 2007; Montero, 2008; Liu et al., 2006; Hsieh & Hong, 2004; Blonigen, 2005).

GDP, measured in US$ million, is a proxy for the domestic market size. A positive relationship between GDP and FDI stocks is expected, as economic growth would attract more foreign investors interested in expanding their markets (Dunning, 2001). The degree of trade openness (OPEN) is measured through a proxy represented by the exports (FOB) plus imports (FOB) in relation to GDP in US$ millions. This variable may have positive or negative effects on FDI. However, in empirical studies related to Asian and Latin American countries, a positive effect was predominant (Hsieg & Hong, 2004; Amal & Seabra, 2007). This was related to the multinationals' interest in imported capital goods and to more advanced technologies required for their production. The real effective exchange rate in US$ (ER) is an index built by Darvas (2012) from the nominal exchange rate and a measure of the relative price between a country and its trading partners (Note 4). According to some empirical studies that use the real exchange rate in their models, it is possible to find both negative (Amal & Seabra, 2007; Blatter, 2006) and positive effects of this variable on FDI (Barros et al, 2013; Blatter, 2006). The positive effect may be related to the real devaluation of the national currency, which would reduce the multinational's relative investment costs in the recipient country, compared to the country of origin. However, this same devaluation could increase the value of imports that are very important for the productive structure of multinationals. The inflation rate of countries (INF) represented by the GDP deflator, based on the Consumer Price Index (CPI), is a proxy for economic stability. By generating uncertainty and undermining the real income of consumers, the increase in the inflation rate could contain foreign investors. Therefore, a negative effect of the inflation rate on FDI levels is expected.

The corruption control (CORRUP) is an index built by the Political Risk Service (PRS) to assess corruption within the political system (Note 5). The index ranges from 0 to 6 points—the higher the index, the greater the control exercised over corruption. Increased control over corruption can improve the economic, political, and social environment of a country, thereby attracting more FDI. The investment profile (PINVEST) is a PRS index consisting of the sum of three subcomponents: a feasibility/expropriation contract, profit repatriation, and late payments. Each of these components has a score of 0 to 4, and the general index is the sum of the three components (index = 12, implies low risk for investments). In general, the higher the index, the lower the risk for foreign capital and the better the situation for FDI (positive relationship). Governmental stability (GOVSTAB) is a proxy for political risk, linked to the government's ability both to carry out its planned programs and to stay in office, which is also built by PRS, based on the sum of three other categories: government unity, legislative force, and popular support. The general index ranges from 0 to 12, with 12 being the most stable government (lower political risk). For the foreign investor, a country where the government has the stability to conduct the appropriate policies for economic development is a better prospect.

The stock of FDI in US$ millions is an annual series available on the website of the United Nations Conference on Trade and Development (UNCTAD) and the real GDP (at 2005 constant prices). The series for exports (FOB) and imports (FOB) are also expressed in US$ million and are found on the World Bank website (World Development Indicators), in addition to the inflation rate measured by the GDP deflator. The real exchange rate is an index built by Darvas (2012). The investment profile, control of corruption, and government stability are indices constructed by the PRS through the International Country Risk Guide and must be purchased through the website. All these data series are complete, both for the period in question and for all countries involved. In the case of FDI stock, data were deflated with the US Consumer Price Index, available on the US Inflation Calculator, taking 2005 as the base year.

4. Results and Discussions

In this study, the model estimates are performed by using the system GMM estimator (Generalized Method of Moments), based on the works by Arellano and Bover (1995) and Blundell and Bond (1998). The choice of this estimator is justified by the need to address the following issues: a lagged dependent variable ($FDI_{i,t-1}$) used as a regressor, which features a dynamic panel; the presence of explanatory variables not strictly exogenous; unobserved heterogeneity, and time-invariant factors among the sample countries; and possible autocorrelation in the individual units and heteroscedasticity across the countries.

The model expressed above, in (1), was estimated. This estimation considered the robust standard error option, the possibility of heteroscedasticity, and treatment of the variable GDP as being endogenous to the model and the variables OPEN and ER as being predetermined. Moreover, lagged values were used as instruments corresponding to the momentum conditions, both in level and first difference, considering the explanatory and dependent variables (Note 6). The results are presented in Table 1.

Table 1. Dynamic Panel Results

Depended Variable: FDI		
Variables	Coefficients	Robust standard error
FDI (-1)	0.8341 ***	0.03349
GDP	0.2469 ***	0.05440
OPEN	0.2107***	0.05616
ER	0.2600 ***	0.07731
INF	0.1306	0.01509
PINVEST	0.2247 *	0.09136
STBGOV	- 0.0128	0.07643
CORRUP	0.0505	0.03314
LATIN	0.3096***	0.08813
CRISES90	- 0.0976***	0.01934
CRISIS08	- 0.1757***	0.06645
EXTCRISIS	0.04887 ***	0.01949
CRISIS08XLATIN	0.1565 **	0.07452
EXTCRISISXLATIN	- 0.0149	0.02623
CONSTANT	- 3.8 ***	0.8170
Number of observations = 345		
Number of groups = 21		
Number of instruments = 275		
Instruments for differentiated equation:		
GMM = IDE(-2), OPEN(-1), CAM(-1), PIB(-2)		
Instruments for level equation:		
GMM = D.IDE(-1), D.OPEN, D.CAM, D.PIB(-1)		

Note: *** 1% significance, ** 5% significance * 10% significance.

Source: results.

Overall, the results indicated the model adequacy, with a strong relationship between FDI stocks and most of the items proposed in the literature. The importance of lagged FDI as an explanatory variable for the current stock investment is especially remarkable. Its coefficient, $\delta = 0.83$, was positive and highly significant. While this coefficient shows the short-term impact on current FDI stocks, the balanced adjustment rate is given by $\xi = 1 - \delta$, which results in $\xi = 0.17$. This rate implies that the adjustment to the desired FDI stock is neither complete nor instantaneous and that only 17% of the short-term and long-term differences are adjusted each period (year). This is due to the rigidity of the production process, inertia, and existing contractual obligations, which hinder the adequacy of the existing inventory vis-à-vis the desired capital stock.

With regard to the economic explanatory variables, the model showed that, from 1995 to 2013, factors such as market size (GDP), OPEN, and ER had a statistically significant positive relationship with FDI stock, thereby being important determinants of this investment level in the sample countries. Inflation rate has a positive sign, but it was not statistically significant in the model. Among the explanatory variables that represent institutional environment, PINVEST was important for FDI attraction, as it has a positive significant relationship with the FDI. The variables representing government stability and corruption control were not statistically significant in the model. The dummy variable that represents the crisis period in the 1990s in the developing countries, CRISES90, had a highly significant negative coefficient. These crises undermine the foreign investment attraction to countries in the regions investigated. The dummy variable LATIN had a positive sign and was statistically significant, only indicating that the FDI level between two regions is different.

The dummy variable CRISIS08 was negative and statistically significant, indicating that the financial crisis in 2008 had a negative impact on the FDI stock in Asian countries. When keeping everything constant during the crisis, FDI stocks in Asian countries fell by 17.57%, on average, compared to other periods. Importantly, this negative effect of the crisis on FDI cannot be associated with any fluctuation in the variables expressed in the model (e.g., drop in GDP), since such variables are constants.

Besides the risks and uncertainties arising from the crisis, and the difficulty of capturing credit, other factors can help explain this FDI drop in Asian countries. A sharp decline in demand from developed countries caused a decrease in the Asian countries' exports, thus affecting the export-oriented FDI in the region. The crisis also affected the financial sector in many countries in the region, especially Hong Kong and Singapore, which are traditional international financial centers. Malaysia, for instance, with a much more internationalized financial market, was quickly contaminated by the crisis, which compromised the country's credit structure and capital markets.

The interaction CRISIS08XLATIN was statistically significant at 5%, confirming that the effect of the crisis on FDI stocks differs between Asian and Latin American countries. The coefficient value indicates the deviation around the mean. Thus, the impact of the crisis on FDI stocks in Latin America was -0.0192 (-0.1757 + 0.1565). This indicates that, by keeping everything constant, FDI stocks in Latin America fell by 2%, on average, during the crisis, compared to other periods. It was expected that this crisis had a negative impact on FDI, associated with both the risks and uncertainties of the period and the deterioration of other economic and financial factors that determine the FDI.

According to ECLAC (2009), several factors may be related to this FDI drop in Latin American countries. These factors include a drop in commodity prices in late 2008, which affected investments in natural resources; and the US recession, which has damaged investment in export platforms in Mexico and Central America. Moreover, the crisis also hit production and investments in European countries, which are among the main investors in Latin America.

The analysis of the dummy variable CRISIS08 and its interaction CRISIS08XLATIN shows that the subprime crisis had a negative impact on the countries of the two regions. These dummy variables also show that the impact of the crisis differed between the regions, as the FDI stock retreated more in Asian than in Latin American countries. It is believed that these differences are related to the vulnerability and heterogeneity of the countries in each region: both these factors are FDI determinants not included in the model. The dummy variable EXTCRISIS was statistically significant at 5% and presented a positive sign, showing that the FDI stock increased by 5%, on average, in Asian countries during the spread of the crisis from 2009 to 2012. The interaction EXTCRISISXLATIN had a positive coefficient, but it was not statistically significant. This implies that there is no evidence the post-crisis period has had differentiated impact among the countries in Asia and Latin America.

By following this interpretation, it is expected that the FDI stocks have also increased by 5% in Latin America during the spread of the crisis. This result meets expectations and may be linked to several factors, such as counter-cyclical policies adopted by local governments in both regions to revive economies and specific policies for attracting foreign capital. It should also be considered, among other factors mentioned, that uncertainties and risks in developed economies made foreign investors redirect their capital to countries that are less affected by the turbulence and/or have better prospects for economic performance. With the developed countries still undergoing the crisis effects in 2011, Latin American countries, like Brazil, Chile, and Colombia, increased their credibility in the region and encouraged market-seeking investments–linked to both demand attractiveness and middle class growth of these countries (Birdsall, 2012). In Asia, regional trade was growing again, especially between China and the ASEAN (Association of Southeast Asian Nations) countries, with the discussion of an agreement for a free trade area, which strengthened regional integration and inter-regional FDI (UNCTAD, 2010).

The moment conditions used in GMM system estimation would be valid only if the errors are not auto-correlated. The Arellano–Bond autocorrelation test is applied to the equation errors in first difference, considering the first- and second-order autocorrelations. Then, the null hypothesis is tested for no serial correlation in second order. Normally, the null hypothesis is rejected in the first-order autocorrelation, without being a problem of poor model specification. In the case of the second-order correlation, it is expected that the null hypothesis will be not rejected, signaling the validity of the moment conditions used.

In this case, the Arellano–Bond test for error autocorrelation indicates that errors are correlated in the first order. However, as seen in Table 2, there is no evidence of serial correlation in the second-order differentiated errors (i.e. H0 not rejected). This implies that the moment conditions used in the GMM system are valid and, thus, validate the model results.

Table 2. Arellano–Bond test for error autocorrelation

Order	z	Prob > z
1	- 2.96	0.0030
2	- 0.87	0.3999

Note: H0: no correlation.

Source: results.

5. Conclusions

This study evaluates the impact of the international financial crisis (subprime) on FDI behavior in Asian and Latin American emerging countries. Through the econometric model, it was found that the 2008 financial crisis had a negative impact on FDI levels in both regions studied. However, the magnitude of the crisis effect was different in the two regions, reducing more FDI stocks in Asia than in Latin America. It is believed that this difference is mainly associated with the vulnerability and heterogeneity of the countries' macroeconomic and institutional structures. In addition, these developing Asian and Latin American countries were not adversely affected by the crisis spread, in terms of FDI stock, compared to the developed countries. On the contrary, during this period, the developing countries attracted more foreign investments. It is believed that this reflects the counter-cyclical policies adopted by these countries to attract FDI. Also, it may reflect the uncertainties and risks related to the developed economies.

Additionally, the econometric model results showed the importance, not only of lagged FDI but also of economic and institutional variables (e.g. GDP, exchange rate, trade liberalization degree and investment profile), for attraction of direct investments during the period of study in Asian and Latin American countries.

The international financial crisis and its extension have caused serious consequences in various aspects of the world economy (e.g. financial breaks, and falls in production, trade, employment etc.), and this article revealed effects on FDI in the emerging countries studied. For many developing countries, where FDI compensates for lack of domestic private investment, it is important to understand that this results in a better understanding of FDI behavior. It would be particularly important for the local governments to consider the formulation of public policies in terms of capital attraction and for protection during financial crises that undermine the whole economic structure. Thus, there should be measures to strengthen financial systems (e.g. stricter regulations, constant supervision, and consultation with international financial institutions) and macroeconomic measures to prevent crises through more balanced monetary and fiscal policies, without compromising the public accounts and the financial system. However, in the face of crises, there are critical policies, such as the policies for tax and credit access that reheat domestic demand and attract more foreign investment.

In addition, by studying the relationship between crisis and FDI in Asian and Latin American emerging countries, we can contribute to the characterization of the current investment behavior in the developing countries at a global level. For future studies, we intend to extend this analysis to developed countries, both to allow a more general understanding of the subject and to facilitate comparison of the results with the developing countries.

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Notes

Note 1. According to Dunning (1992) there are some motivations and determinants that lead firms to compete in the international market. These motivations are mainly linked to economic structure and governmental policies and can be divided into four basic groups: resource seeking, market seeking, efficiency seeking, and strategic asset seeking. Specifically, in strategic asset seeking the acquisition of resources and strategic assets is the main objective for companies seeking to strengthen their competitive position and increase their skills in regional and global markets.

Note 2. The model expressed in (1) is a general model including all the sample countries, both Asian and Latin American. It would be possible to estimate a model for each group of countries separately. However, in different models it is not possible to compare the magnitude of the estimated coefficients in each region; it is only possible to compare the revealed signs.

Note 3. The investment variation in period t is a fraction ξ of the desired range for that period. When $\xi = 1$, the effective capital stock would be equal to the desired stock (instant adjustment). When $\xi = 0$ there would be no investment in *t* (effective capital in *t* would be equal to the capital from the previous period). Overall, what happens is that $0< \xi < 1$ and the adjustment to the desired capital stock tends to be incomplete due to rigidity, inertia, and contractual obligations.

Note 4. The index is a weighted geometric mean of bilateral exchange rate indices, where the weights reflect the relative importance of each partner in trade. The price measure used is the Consumer Price Index (CPI) of the country, taking into account 67 trading partners by country (Darvas, 2012).

Note 5. In order to construct this index, special consideration is given to the kind of potential corruption linked to nepotism, paternalism, favor exchange, illegal financing of parties, and misappropriation of funds and public money. Also, corruption is considered to be linked to financial issues, in the form of special payments, loans, tax incentives, and licenses (PRS, 2015).

Note 6. The system is constructed with (T-2) equations in difference and (T-2) level equations, corresponding to periods 3, ...T, for possible instruments.

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