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Employer-Sponsored Training in Canada: Synthesis of the Literature using Data from the Workplace and Employee Survey

REPORT

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July 2007



***Employer-Sponsored Training
in Canada: Synthesis of the Literature
using Data from the Workplace and
Employee Survey***

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Executive Summary

This report presents a review of studies and articles on employer-sponsored training in Canada. We reviewed all documentation that used data from the Workplace and Employee Survey (WES). Based on that review, we present a synthesis of the current state of knowledge. Our report looks alternately at issues pertaining to determinants of training from the employer and employee perspectives. For each of the two parts, we summarize the results regarding returns on training, their variability across industries, occupations and other characteristics, key barriers to training, and the types of training and supports that are provided by the employer. In our conclusion, we identify the knowledge gaps on the topic.

1. Background

The relationship between employers and employees is currently changing under three general trends that continue to significantly alter the labour market: (1) the aging workforce, (2) increasing market globalization (including outsourcing), and (3) accelerated technological change (including the use of new information technologies). To varying degrees, these changes are likely to have a substantial impact on the standard of living of Canada's population and the capacity of the Canadian economy to maintain its international competitiveness.

In view of these changes, ongoing training is often put forth as a potential solution for enabling firms and individuals to adjust by enhancing their performance and productivity. For example, the process leading to innovation is based on a high level of human capital among workers who can be retained and improved through training (Crépon, Duguet and Mairesse 1998). Thus, it is widely acknowledged that training is likely to have a significant impact on company performance in terms of productivity (Bartel 1995, Black and Lynch 1998, Barrett and O'Connell 2001 and Black and Lynch 2001).

However, several authors note a lag on the part of Canada compared to its main competitors regarding employer-sponsored training. For example, some authors showed that the incidence of company training is much lower in Canada than in some European countries, (OECD (2003). Others showed differences between Canada and the United States in terms of who receives training (Fortin and Parent 2006). Nevertheless, it is difficult to say with any certainty that the level of employer-sponsored training in Canada is below the optimal level. Even so, it is important to have a good understanding of the determinants of training supply and demand on the part of employees and workplaces in Canada as well as training returns. In fact, only a cost/return comparison would determine whether there is indeed a lack of employer-sponsored training in Canada.

2. Training Data in Canada

For quite some time, the primary source of information on training activities in Canada was the Adult Education and Training Survey (AETS). That survey is the most comprehensive source of Canadian data on training. It contains information on the main topic of training activities, the training provider, the length and sources of training (it covers all types of training, not just employer-sponsored training), as well as the types of support available. It also contains information on the socio-economic and demographic profile of training participants and non-participants. The data for this survey are available for the years 1990, 1992, 1994, 1998 and 2003.

Note that the AETS questionnaire changed considerably over the years. In particular, the sample size is smaller for the more recent surveys. For example, the 1990 version of the survey has nearly 92,808 observations, but there were only 25,048 observations in 2003. Its main limitation is the lack of information on employers.

In part because of that gap, Statistics Canada introduced the Workplace and Employee Survey (WES) in 1999, which collects detailed, longitudinally matched data on employers and their employees. This approach makes it easier to perform a more thorough analysis of the determinants of company training. It also makes it possible to analyse the impact of training on company performance. Nearly 5,440 Canadian establishments, previously sampled by industry, geographic location and number of employees, were questioned regarding composition of the workforce, number of vacant positions in the firm, human resource practices, company strategies, etc. Statistics Canada adjusts the initial firm sample every two years to ensure that it continues to be representative in all relevant strata. The data from the 1999-2003 surveys are currently available.

The WES also includes a questionnaire given to certain employees at select establishments. The employees are sampled using lists provided by the employer. A maximum of 24 employers is selected in each institution questioned, for a total of 23,540 employees in 1999. These employees are tracked for two years, after which a new sample is taken. The employee part of the Survey is for developing the variables that are characteristic of the firm's workforce in regressions at the establishment level and analyses the impact of training at the worker level.

The WES questionnaire distinguishes between two types of training provided by establishments: classroom training and on-the-job training. Note that this dichotomy differs from what is traditionally done in labour economics, where the distinction is made between specific training (which increases the productivity only of the workers of the employer that provided the training) and general training (which increases the productivity of people working for any employer). It is generally acknowledged that classroom training deals more with general knowledge and on-the-job training with specific knowledge (Barrett and O'Connell 1999). Note also that some authors even challenge the concept of specific training (Lazear 2003). Therefore, in this paper we use the WES classification.

The 1999 version of the WES shows that 54% of workplaces provided training. Thirty-one percent provided classroom training and 45% on-the-job training. Turcotte, Léonard and Montmarquette (2003) reported that 84% of individuals worked in workplaces providing training, and therefore 16% of the labour force had no access to company training. Since 55% of workers receive training, this means that 29% of workers have access to training but do not participate.

2.1 Research with the WES

Several papers focused on identifying worker characteristics that make them more likely to receive training. This was the objective of the work by Belzil and Hansen (2006) and Gagnon and Doray (2006). Other work focused on a subset of workers such as immigrants, Yoshida and Smith (2005) and Lochhead (2002) or women Drolet (2002). Yet others focused on identifying and measuring returns at the worker level Havet (2006).

One series of papers focused on determinants of training intensity at the establishment level: Dostie and Pelletier (2007), Chaykowski and Slotsve (2003, 2005 and 2006), Rabemananjara and Parsley (2006) and Turcotte *et al* (2003). Intensity was most often measured as the percentage of employees trained, but other studies used training expenditures per employee Chaykowski and Slotsve (2006).

The papers that focused primarily on the impact of training on various company performance measures include the work of Morissette and Rosa (2003) on resignation rates Therrien and Léonard (2003) on innovation, and Turcotte and Rennison (2004a), Dostie and Pelletier (2007) and Kayahan (2006), all three of which covered establishment productivity.

Most of the research used only a cross-section. Only six documents used data from more than one year: Dostie and Pelletier (2007), Chaykowski and Slotsve (2006), Havet (2006), Kayahan (2006), Morissette and Rosa (2003) and Yoshida and Smith (2006). Only two of the latter studies used the longitudinal aspect to take into account unobserved heterogeneity at the establishment level or the worker level, but not both simultaneously.

Four studies used models that could be described as more structural. Chaykowski and Slotsve (2006) took into account simultaneity in establishment decisions regarding levels of classroom and on-the-job training provided. Havet (2006) took into account the simultaneity of salary, promotion and training processes at the worker level. Dostie and Pelletier (2007) and Kayahan (2006) took into account the endogeneity of training decisions at the establishment level.

Note that the research papers we refer to are mostly unpublished, partly because they are recent. This means that the results given may be considered preliminary and are not peer-reviewed. Only the works of Turcotte and Rennison (2004a) and Yoshida and Smith (2005) have been published and that of Dostie and Pelletier (2007) is to be released.

3. *Employer Role*

3.1 **Factors underlying employer decisions to invest in training and skills development for employees, including the role of the overall state of the labour market**

Strategy: Although the Workplace and Employee Survey (WES) contains information on company choices in terms of strategy, the link between them and training practices was not consistently studied in the different studies. For example, Dostie and Pelletier (2007) found that firms stating they want to enhance their employees' skills do indeed provide more training. They also noted a negative correlation between training practices and selecting a new development strategy for production techniques and yet a positive correlation with selecting a new product and service development strategy.

This slightly counter-intuitive finding is corroborated to some extent by Turcotte *et al* (2003), who classified establishments into several groups: those placing more importance on strategy and the others. They found that the first ones provided more training. A second group placing more importance on research and development provided less training than the first group, yet more than the firms not placing much importance on strategy. It could be that those firms already hire highly trained individuals and see no further advantage in additional training. The authors also showed that establishments placing a great deal of importance on strategy also tend to favour classroom training.

Chaykowski and Slotsve (2006) attempted to determine whether there is a connection between training practices and how intensely a firm follows a strategy. They distinguished between three types of strategy: (1) research and development, (2) organizational and (3) cost reduction. They found that only the intensity of the research and development strategy is linked with the propensity to provide training. They confirmed this finding through an analysis at the worker level.

Organizational Practices: Several studies also used information on company organizational practices contained in the WES and determined whether those practices correlated with training practices. Chaykowski and Slotsve (2005) showed that the compound probability of providing both classroom training and on-the-job training increases if the establishment uses complementary organizational practices such as flexible job design and problem-solving teams. With flexible job design, as well as self-directed workgroups, they also saw an increase in marginal propensity to provide on-the-job training. However, the existence of joint management-labour committees increases the propensity to provide classroom training only.

3.2 Training delivery, types of training provided and sponsored, and the perceived benefits of the training

Production by worker and payroll: Three studies tackled estimating training returns on company productivity: Dostie and Pelletier (2007), Kayahan (2006) and Turcotte and Rennison (2004a). The three papers used an empirical specification based on the Cobb-Douglas production function, which links per-worker production value or value added to company training practices.

Turcotte and Rennison (2004a) measured company training practices by the percentage of employees trained in the classroom and on the job. They found no statistically significant link between the percentage of employees taking classroom training and company productivity. However, when they differentiated training based on content, they showed that training on computer hardware or software has a statistically significant impact on company productivity. Likewise, the percentage of employees trained appears to have no impact on salaries paid by the firm, regardless of whether the training is in the classroom or on the job and regardless of the type of training. It is clear from the findings above that productivity gains resulting from computer training are greater than wage gains for workers.

Turcotte and Rennison (2004a) confirmed the robustness of these findings through various sample selection strategies. These included separating their sample into manufacturing workplaces and others and showing that only non-manufacturing workplaces can expect productivity gains from computer hardware or software training. They also found a statistically significant impact from classroom training on wages paid in the manufacturing industry. Finally, when they performed separate analyses for small (less than 20 employees) and large establishments, they found a statistically significant positive connection between the percentage of employees who take on-the-job training and the productivity of large firms and showed that smaller firms derive the greatest productivity gains from computer training.

Dostie and Pelletier (2007) used the same analysis framework as Turcotte and Rennison (2004a) did. However, their empirical analysis innovated on two aspects of the earlier work: (1) they accounted for the fact that company training decisions are endogenous or the fact that only establishments expecting gains from their training practices will go ahead with training their employees and (2) they accounted for the fact that decisions regarding number of employees to train each period depend on market conditions (which they call unobserved productivity shocks). For example, a firm that experiences a temporary decline in demand for its product may take advantage of that to train its employees, whereas an establishment that is having difficulty meeting demand may have to cut its training activities temporarily.

As expected, the authors found that the results obtained without considering endogeneity of training decisions overestimated the impact of training on company productivity. In both cases, however, the impact of training on productivity was not statistically significant. It was only when they took unobserved productivity shocks into account that they found that training had a statistically significant impact on productivity, but even then only with classroom training. Overall, Dostie and Pelletier's (2007) results are

similar to those obtained by Turcotte and Rennison (2004a). Note that, in all of Dostie and Pelletier's (2007) results, regardless of estimation method used, the percentage of employees who are classroom-trained has a greater impact on company productivity than the percentage of employees trained on the job.

Kayahan (2006) went slightly further and argued that the work of Turcotte and Rennison (2004a) and Dostie and Pelletier (2007) did not satisfactorily capture company training practices because all they used to measure training was the percentage of employees trained. According to Kayahan (2006), it is important to measure the intensity of each employee's training. Capturing this intensity is possible because the WES asks employees how many days they spent taking training. Using an estimation method that also considers unobserved productivity shocks, they obtained results similar to those by Dostie and Pelletier (2007), including the fact that classroom training has a statistically significant positive impact on company productivity and that on-the-job training also has a positive impact (although not statistically significant).

Innovation: Therrien and Léonard (2003) showed that training, when part of a human resource management system that may include variable compensation practices or work teams, may also be beneficial in terms of innovation-related performance. In fact, the descriptive statistics showed that establishments that innovate use 65% classroom training and 79% on-the-job training versus 42% and 67% for establishments that do not innovate. However, their multivariate analysis in which they take into account other innovation-related factors did not identify a statistically significant causal impact of training on innovation.

3.3 The relationship between training and labour market characteristics such as competitiveness, innovation, technology use and employment stability

Competitiveness: While Turcotte *et al* (2003) found that establishments with a number of competitors are more inclined to provide training, Dostie and Pelletier found no link when taking into account unobserved heterogeneity at the workplace level.

However, Chaykowski and Slotsve (2006) showed that the source of the competition may impact the provision of training. They showed that competition from sources other than local establishments has a positive impact on the propensity to provide classroom training, whereas for on-the-job training, the impact is positive for all types of competitors except international competition (not including the United States).

Chaykowski and Slotsve (2006) also studied the impact of competition source on the percentage of employees trained and found different effects. Firms with no competition or just local competitors do less classroom training and more on-the-job training. The authors also showed that firms facing international competition train a higher percentage of their employees, either in the classroom or on the job. Competition from the United States also has a positive impact on the percentage of employees involved in classroom training. Chaykowski and Slotsve (2005) confirmed several of these findings and also showed that

competition with U.S. firms increases per-employee training expenditures (for workplaces that provide training).

Innovation: Do establishments that innovate or implement new processes more likely to provide their employees with training? Turcotte *et al* (2003) and Chaykowski and Slotsve (2006) showed that an establishment that innovates is more inclined to provide training and trains a higher percentage of employees through both classroom and on-the-job training, Turcotte *et al* (2003). Chaykowski and Slotsve (2006) and Kayahan (2006) even showed that, at the worker level, the probability that they will receive training is higher if they work at a workplace that innovates.

Chaykowski and Slotsve (2005) make a distinction between whether the innovation is with production processes or products and services. They found that both types of innovation lead to more training, whereas Dostie and Pelletier (2007) found an impact only for process innovations.

Technology use: It is generally expected that workplaces using new technology more intensely also train their employees more. This is because technological progress tends to increase the obsolescence rate of the human capital associated with its use. Firms may therefore turn to workplace training to upgrade their employees' knowledge or maintain it at a sufficient level.

The research on this topic does confirm that establishments that introduce new technologies or new software are much more inclined to train their employees: 46% versus 25% for classroom training, and 60% versus 39% for on-the-job training. In both cases, the percentage of employees trained is also higher, Turcotte *et al* (2003). The same results were also obtained at the worker level.

Turcotte *et al* (2003) also showed that the propensity to provide training and its intensity increase with the percentage of employees using a computer and with technological change. A similar relationship was seen for the link between training and computer use at work at the worker level.

However, the relationship between technology use and training may be more complex. In fact, Chaykowski and Slotsve (2005) showed that the probability of a worker participating in training changes convexly with the number of years of computer experience, i.e. that workers using a computer receive more training at the beginning, followed by a decline for several years and then a rise some time later.

Chowhan (2005) developed various technological skill indices for each firm and showed a positive relationship between these indices and the propensity to provide training and its intensity.

Employment stability and staff turnover: Labour mobility can prove to be a damper on training efforts because it reduces a firm's expected return on training (the return is nil if the employee quits his/her job after receiving training). However, if mechanisms are in place to have recipients pay for their training, it is not clear whether such a link would be seen.

All three studies by Dostie and Pelletier (2007), Chaykowski and Slotsve (2006) and Turcotte *et al* (2003) found that establishments with a high turnover rate are more likely to provide on-the-job training and train a higher percentage of employees. Chaykowski and Slotsve (2006) also showed that establishments making staff reductions also provide more on-the-job training. Havet (2006) showed that this finding holds true when they included turnover rate as an explanatory variable in worker-level regressions. These same studies found no link between incidence of classroom training and staff turnover. Chaykowski and Slotsve (2005) showed that this finding remains even if mobility is measured by the hiring and layoff rate.

This finding is consistent with the match between on-the-job training and specific training. This way, new employees acquire through on-the-job training the minimum knowledge required for functioning properly in the firm.

As for employment stability, the results are modest. Turcotte *et al* (2003) found that permanent employees are more likely to take both classroom training and on-the-job training. However, (Havet 2006) found no impact. Gagnon and Doray (2006) were in the middle and showed a positive impact for classroom training and no effect for on-the-job training.

Morissette and Rosa (2003) specifically focused on the impacts of formal training on group decision-making or problem-solving, team building, ability to lead and communications and showed that, unlike what they were predicting, this type of training is associated with a higher resignation rate. The authors did not explain this finding that was counter to their expectations.

3.4 Key determinants and barriers in the provision of training - do they vary by industry, occupation, firm size, gender, education, union status, age, etc.?

Firm size: The general finding is that the larger the establishment, the higher the probability that it will provide training, Rabemananjara and Parsley (2006), Chaykowski and Slotsve (2005 and 2006), Turcotte *et al* (2003). Chaykowski and Slotsve (2005) showed that a very large share (46%) of small businesses (less than 20 employees) do not provide training. They also stated that 94% of medium-sized businesses (between 20 and 100 employees) and 97% of large firms (over 100 employees) provide training. Chaykowski and Slotsve (2005) showed that this relationship holds for all types of training (classroom or on the job; basic, vocational, organizational or technical).

These findings may reflect the existence of limited training funds, which would obviously affect smaller firms more than the larger ones. An alternative hypothesis is that small companies derive fewer gains from training. Since that is exactly what Turcotte and Rennison (2004a) found, it is difficult to identify the specific reason for this size/training relationship.

Turcotte *et al* (2003) developed descriptive statistics that nevertheless show that the intensity of classroom training decreases with firm size, whereas for on-the-job training, they saw a decrease in intensity when they compared small firms to medium-sized ones and an increase when they compared medium-sized firms to the larger ones. In general, this indicates that government intervention for increasing the percentage of employees trained would probably target larger firms with the aim of increasing training intensity.

With the regressions, when other factors affecting training decisions were taken into account, a positive relationship was also seen in general between propensity to provide training and workplace size. For training intensity, however Dostie and Pelletier (2007) found no statistically significant link, whereas Turcotte *et al* (2003) found a positive relationship. The two studies measured size differently. Dostie and Pelletier (2007) used the log of the number of employees, and Turcotte *et al* (2003) used category indicator variables.

These results need to be compared with those obtained from regressions at the worker level. Belzil and Hansen (2006) found that workers are more likely to take classroom training as firm size increases, but obtained no conclusive results for on-the-job training. Havet (2006) obtained essentially the same results, but in addition showed that a size increase for workplaces with over 500 employees does not increase (marginally) the propensity to take classroom training. Gagnon and Doray (2006) obtained the opposite result: they found that participation in classroom training decreases with workplace size. They found no link between size and participation in on-the-job training.

Non-profit companies: Several studies, Turcotte *et al* (2003), Belzil and Hansen (2006)¹ found that non-profit establishments have a greater propensity to provide classroom training than other firms. Only Belzil and Hansen (2006) found a similar effect for on-the-job training. Depending on whether they provide training, the percentage of employees trained was not higher than for the other establishments. However, Havet (2006) found the opposite: in regressions at the worker level, she found that the probability that an employee will participate in training is not affected by his/her status.

Sectors: From a descriptive perspective, the sector providing the most training is the finance and insurance sector (59% and 64% of workplaces, respectively, provide classroom and on-the-job training) and the one providing the least training is the real estate and rental sector (19% and 27% respectively).

When they took into account other factors affecting the provision of training, Turcotte *et al* (2003) identified the following sectors that provide more training: finance and insurance, communication, and health and education. This finding is largely shared by Chaykowski and Slotsve (2006), who noted that workplaces in these sectors are more likely to provide training and to a higher fraction of workers than workplaces in the other sectors. In addition to the real estate and rental sector, they also identified the retail sector as one in which less training is done. These same differences across industries were observed by Havet (2006) and Gagnon and Doray (2006). Belzil and Hansen (2006)

¹ Dostie and Pelletier (2006), Chaykowski and Slotsve (2005) and Kayahan (2006) excluded non-profit companies from their analyses.

argued that these differences are probably connected with the skill level used by each industry, even though these differences remain when the education level of the workforce at each establishment is taken into account.

Regions: When comparing across provinces, the observation is that the percentage of establishments providing classroom training ranges from 23% to 35%. Quebec has the highest observed percentage, and the Atlantic region has the lowest. For on-the-job training, the roles are reversed: in this case Quebec and the Atlantic provinces have the lowest percentages of establishments providing this type of training, while Ontario has the highest observed percentage.

For Quebec, Turcotte *et al* (2003) attributed these interprovincial differences to Bill 90, which imposes penalties on businesses that do not allocate a certain percentage of their payroll to training activities. Businesses would therefore respond by substituting on-the-job training for formal training in order to comply with the legislation.

There are also major interprovincial differences in the percentage of employees trained in the classroom among firms that provide this type of training, which range from 59% to 68%. The percentage is lowest in Quebec and the Atlantic provinces and highest in the Prairie provinces (Manitoba, Saskatchewan and Alberta). The percentage of employees receiving on-the-job training (again depending on whether the establishment provides it) ranges from 54% to 75%. Once again, the percentage is lowest in Quebec and the Atlantic provinces and highest in the Prairie provinces.

Occupation: With worker occupation, the rates of classroom training range from 21% to 54%. Workers more likely to receive classroom training are professionals (54%) and managers (44%). Those less likely are workers whose occupation is connected with sales and retail. The differences are much less pronounced for on-the-job training, with the rates ranging from 27% to 34%.

Gender: Some studies tried to determine whether there is discrimination in the provision of training. If there were discrimination and if training had a positive impact on wages, this would point up a relatively easy way to reduce the gender-related wage inequality. If there is no discrimination, it may also be that employers are less interested in investing in the human capital of women if they expect a lower return due to a weaker attachment to the labour market.

Drolet (2002) showed that training expenditures are not appreciably different between men and women. She also showed that the probability of receiving training as well as the number of training sessions taken in the past 12 months are the same for both men and women. However, she noted a slight difference in training intensity, but this difference is in favour of women, who spent an average of 7.4 days in the classroom versus 5.8 for men.

Belzil and Hansen (2005) found in their regressions, though, that women are slightly less likely to take on-the-job training. Havet (2006) took into account the longitudinal nature of the data using the 1999-2000 versions of the WES and found no impact.

Age: When training is considered an investment in human capital, it is expected that individuals will invest less as they age because the time horizon during which they can reap the benefits of that investment shrinks with age. Others argue that work productivity starts to drop after a certain age, Skirbekk (2004) and that firms therefore derive smaller returns from training older workers. Regardless of the reason, it follows that we would expect older workers to be trained less.

Research with the WES showed that age has the opposite effect on each of the two types of training: classroom training increases with age and on-the-job training decreases, Belzil and Hansen (2006). The unanticipated finding regarding the link between age and level of classroom training is still unexplained. It would be interesting to see whether the returns from classroom training increases with age or whether level of training received is perceived by employees as a form of complementary compensation.

Education: Again it is expected that more highly educated employees are more inclined to invest in their training because the establishment would derive greater returns by providing further training to this category of workers, Bartel and Lichtenberg (1987). The general finding is that participation in classroom training does increase with education. The rate of on-the-job training is generally more consistent across the various education levels. However, this latter finding is still the subject of debate: some studies found a positive impact, others a negative impact and others no impact at all. Thus, this finding is consistent with the results from other studies showing that classroom training yields greater returns than on-the-job training.

3.5 The relationship between employer-sponsored training and unionized employees, employees with disabilities and immigrants

Unionization: Chaykowski and Slotsve (2005) showed that the percentage of establishments providing classroom training is 60% for firms covered under a collective agreement versus 44% for firms that are not. The same percentages for on-the-job training are 45% versus 28%, respectively. This finding is valid for all types of training (basic, technical, vocational or organizational). These differences are less pronounced at the employee level: 41% (31%) of those covered under a collective agreement take on-the-job (classroom) training versus 35% (30%) that do not.

When other factors are taken into account using regression tools, though, the results become more ambiguous. Some studies found that the propensity to provide on-the-job training is positively affected by the existence of a collective agreement, Chaykowski and Slotsve (2005) and others found no connection. As to the propensity to provide classroom training, some studies found a negative impact, Chaykowski and Slotsve (2005) and others, no impact. Chaykowski and Slotsve (2005) found, however, that training intensity increases with the existence of a collective agreement, for all types of training.

This latter finding is consistent with the one whereby, at the worker level, being covered under a collective agreement has an unequivocal positive impact on the probability of participating in on-the-job training. Finally, for classroom training, some studies found a positive impact and others, no impact.

Chaykowski and Slotsve (2006) showed that the type of training taken also varies with the firm's union status. They found that employees at unionized establishments are less likely to take basic training courses in a classroom or vocational on-the-job training. These authors also focused on collective agreement clauses. Among other things, they found that participation clauses are associated with higher training rates.

Immigrants: Here, too, modest results were obtained. Belzil and Hansen (2006) found that being born in Canada has no impact on the propensity to take training. Chaykowski and Slotsve (2006) showed a negative impact on the propensity to take classroom training but a positive impact for on-the-job training. Doray and Gagnon (2006) found a negative impact on both types of training. Lochhead (2002) and Yoshida and Smith (2005) showed that immigrant status has a negative impact on the probability of taking training, but Yoshida and Smith (2005) showed that this negative impact is less for immigrants with a higher level of education, and Lochhead (2002) saw a similar reduction when she took language spoken into account. Yoshida and Smith (2005) also assessed the impact of training on wages and showed greater returns for immigrants than for people born in Canada.

4. *Employee Role*

4.1 Is there a private return on training in Canada?

Wages: In theory, it is traditionally expected that training increases wages. This assumes of course that training increases worker productivity and that a worker's wages reflect his/her marginal productivity, Becker (1975).

This issue was studied in greater detail by Havet (2006). Havet (2006) started by showing that individuals taking classroom (on-the-job) training earn an average hourly rate of \$22.50 (\$20.91), whereas individuals not taking any training earn an average of only \$17.65. With worker-level regressions, she found that, even controlling for other variables affecting hourly rate, training (regardless of type) has a positive impact on the wages of women (but not men).

Yoshida and Smith (2005) found a positive impact from training on wages, but did not differentiate returns by gender. However, Havet (2006) showed that, for all individuals, training has a positive impact on the probability of promotion (and therefore indirectly on wages).

While Havet (2006) focused on the impact of training incidence, Drolet's (2002) results helped determine whether training intensity has an impact on wages. She regressed the average hourly rate by the per-employee amount spent on training and found that the amount increases for men but not for women. This finding seems to contradict Havet (2006). Further analysis that would simultaneously analyse training incidence and intensity would reconcile the two findings.

Promotions: Havet (2006), who took into account the potential simultaneity between training and promotion decisions, showed that taking on-the-job training has a positive impact on the probability of promotion, whereas classroom training has no impact.

4.2 Perceived barriers to training and benefits of training

Barriers to training: Although one section in the Workplace and Employee Survey (WES) questionnaire asks individuals who are offered but refuse training what their reason for refusing is, it appears that this data was not analysed by the research papers included in this literature review.

Job satisfaction: This issue remains largely unstudied. Leckie, Léonard, Turcotte and Wallace (2001) presented some preliminary findings on this. Among other things, they showed that the percentage of employees who are very satisfied with their job was higher in establishments that participated in training activities, that employees reporting that the training they received was reasonably sufficient for the requirements of their positions

were also more inclined to report being very satisfied with their job. Finally, they also showed that employees in establishments where the number of training activities provided had increased were also more satisfied.

4.3 Factors that influence the decision to choose between the two types of training – classroom and on-the-job training

Classroom or on-the-job training: The literature on training with the WES is not conclusive about whether classroom and on-the-job training are complementary. At the worker level, Havet (2006) found that the decisions to participate in the two types of training are correlated, i.e. that a worker participating in classroom training is also more likely to take on-the-job training. Turcotte *et al* (2003) found that the correlation is not significant, but used only 1999 data and did not take the longitudinal nature of the data into account.

At the workplace level, however, Turcotte *et al* (2003) found that firms providing classroom training are also more likely to do on-the-job training. This finding is corroborated by the Chaykowski and Slotsve study (2006) which found that these decisions are not only correlated (correlation coefficient of about 0.6) but simultaneous. They also showed that, by not taking this correlation into account, there is the risk of biasing the estimates of the impact of various determinants on the provision of training.² Therefore, the finding is that there is a certain degree of complementarity at the establishment level, but it is still uncertain whether a worker taking classroom training is just as likely to take on-the-job training.

² Belzil and Hansen (2006), Dostie and Pelletier (2006), Gagnon and Doray (2006) and Chaykowski and Slotsve (2005b) did not take this correlation into account.

5. Conclusion

5.1 Key Findings

The findings pertaining to training incidence and intensity for the selected studies and variables are summarized in Table 1 (for workplaces) and Table 2 (for workers). We also summarize the impacts of training on establishments and employees.

5.1.1 Which employers give training?

An initial look at Table 1 first reveals a relative consensus on the factors linked to higher training incidence and intensity alike, namely (1) innovation (2) use of new technologies and (3) workforce turnover rate.

The largest firms are more likely to provide training, but the results regarding intensity are conflicting. In our view, the most persuasive results are those from Chaykowski and Slotsve (2006), who showed a negative relationship with per-employee training expenditures. Chaykowski and Slotsve (2005), Chowhan (2005) and Turcotte *et al* (2003) used only 1999 data, while Dostie and Pelletier (2006) did not allow for non-linearity in their model.

As to the impact from number of competitors, we prefer the results of both Dostie and Pelletier (2006) and Chaykowski and Slotsve (2006), both of which used the longitudinal aspect of the Workplace and Employee Survey (WES). The differences between the two studies seem to result from the fact that the first authors did not take competitor source into account. Thus, Dostie and Pelletier's results can be interpreted as providing the aggregate impact of competition, whereas Chaykowski and Slotsve (2006) showed that the number of competitors can increase training if those competitors are from certain predetermined regions. Few explanations are given as to why the impact from number of competitors varies this way.

As to assessing the impact of the existence of a collective agreement, we first note that only the Dostie and Pelletier results (2007) took into account the longitudinal nature of the data and the endogeneity of training decisions. Regarding intensity, their results were identical to those of Chaykowski and Slotsve (2005). However, for incidence, Dostie and Pelletier (2007) found no opposite impact of classroom versus on-the-job training like Chaykowski and Slotsve (2005) did. Since the various authors did not use the same versions of the WES, it is hard to say whether this finding is the result of using different methodologies.

5.1.2 What are the returns of this training for establishments?

Although there is no agreement on the size of the returns, Turcotte and Rennison (2004a), Dostie and Pelletier (2007) and Kayahan (2006) showed that classroom training seems to yield greater productivity gains than on-the-job training. The most profitable type of training seems to be computer hardware and software training, Turcotte and Rennison (2004a). However, there seems to be a great deal of variation in expected returns, which are apparently higher for non-manufacturing firms and large firms. The Therrien and Léonard study (2003), though, did not identify any causal impact of training on company performance in terms of innovation. Note that causality is difficult to pinpoint because several studies showed a high correlation between degree of innovation and training, Turcotte *et al* (2003), Chaykowski and Slotsve (2006) and Kayahan (2006).

5.1.3 Which employees receive this training?

The findings on incidence of employee training are summarized in Table 2. It is immediately obvious that there is consensus on the impact of technology use (positive) and employee gender (no significant impact) on the incidence of training. There is also consensus on the impact of education on the probability of receiving classroom training.

For the other results, our preference leans towards the findings by Havet (2006), who used four years of WES data and took into account unobserved heterogeneity at the worker level. The opposing results by Belzil and Hansen (2006) and Gagnon and Doray (2005) may result from the fact that the first authors used 1999 data and the second used 2001 data. Note also that Belzil and Hansen (2006) accounted for the fact that observations on employees at the same workplace may be correlated. Unfortunately, no study took into account both this correlation and unobserved heterogeneity at the worker level, which leads us to think that definitive results on incidence of employee training are still to come.

5.1.4 What are the returns for employees?

Training has a positive impact on the wages of the employees taking it, Havet (2006) and Yoshida and Smith (2005), and the magnitude of that impact is greater for women, Havet (2006) and immigrants, Yoshida and Smith (2005). Drolet (2006), however, showed that when focusing on training intensity, training expenditures have a positive impact on men's wages and no significant impact on women's wages. Finally, Havet (2006) found a positive impact of training on the probability of promotion, and Leckie *et al* (2001) presented preliminary evidence linking participation in training activities and job satisfaction.

5.2 Gaps in the Workplace and Employee Survey (WES)

1. Chaykowski and Slotsve (2005) noted that the “workplace” part of the WES contains few questions on the workforce at the workplace. Thus, several authors developed workforce characteristics variables using the “employee” part of the questionnaire. They also wondered whether this approach did not obscure certain factors linked with workplace diversity or the margin.
2. As to the missing variables, Chaykowski and Slotsve (2005a) would also have liked information on per-unit training costs. Turcotte *et al* (2003) noted the low response rate regarding expenses committed for training. Turcotte *et al* (2003) would have liked to know the history of worker training activities, since worker wages reflect both past and present investments in human capital. Comparing workers on the basis of training taken in the past year may not be valid if two workers have the same stock of human capital, with the first worker currently taking the training that the other worker took the previous year.
3. Several authors mentioned the lack of information on the company stock of capital, Turcotte and Rennison (2004a), Dostie and Pelletier (2007) and Kayahan (2006). Estimating a firm’s production function essentially requires knowing the number of employees and stock of capital. Thus, there is every reason to believe that strategies for investing in human capital and physical capital are connected.

5.3 Knowledge Gaps

1. Although several studies showed greater returns from classroom training than on-the-job training, few authors attempted to explain the reason for the difference. Is it perhaps because classroom training covers different topics than on-the-job training? This question has not been systematically studied.
2. Regarding training returns for firms, most studies focused their attention on productivity. However, employee training probably has an impact on other measures of company performance such as product quality, innovation, profitability, customer satisfaction, etc. Since the Workplace and Employee Survey (WES) contains various indicators on these performance measures, it would be interesting to study whether there is a link between workplace training practices and those other performance measures.
3. Most of the research work with the WES dealt with identifying the characteristics of establishments that give and employees who receive training. Few of the research papers examined returns, and even among those that did focus on it, there is no consensus regarding the magnitude of expected returns. One positive is that this research generally tried to take into account the fact that the subset of establishments and workers involved in the training is selected. Thus, it can be said that the identified returns can be generalized to the population of employees and establishments. However, several authors presented results that seem to show that training returns vary greatly depending on who gives or receives it. It would be very interesting to make a systematic comparison of the

structure of expected returns to determine whether it matches the training provision structure. That is indeed necessary for determining whether the level of training provided is suboptimal. For example, if immigrants do receive less training than people born in Canada and if returns are greater for immigrants, this could indicate that the market does not provide the necessary incentives for optimal provision of training for this subgroup. Similar analyses could be done at the workplace level.

4. One complementary issue relates to the complementarity of investments in human capital by the workplace and its other investments in computer hardware or its efforts in organizational structure and human resource practices. If such complementarities exist, it is possible then that the previous analyses underestimate the returns from company training.
5. Few of the research papers addressed training dynamics. Training returns for the establishment and for the worker are not necessarily obtained in the current period. Even though workers are observed for a maximum of two years (firms are tracked longer), it should be possible to obtain evidence on this. Along the same lines, there were no studies on the level and persistence of training offered by the firm and its role in determining the amount of training an individual receives or a firm provides. Analyses using the longitudinal aspect of the data would address these issues.
6. Surprisingly few of the research papers used the longitudinal aspect of the data. However, using longitudinal data in other contexts proved to be useful for taking into account unobserved heterogeneity and endogeneity problems. Belzil and Hansen (2006) specifically cautioned readers not to draw conclusions on the causal relations between the variables in their regression. It can also be shown that significance tests based on analyses that do not take the data structure into account will yield biased results. Table 3 in the appendix shows that only six of the 22 studies reviewed used the longitudinal aspect of the data. At the worker level, only Havet (2006) and Yoshida and Smith (2005) used more than one wave of data. However, Yoshida and Smith (2005) did not use the longitudinal aspect to take into account unobserved heterogeneity at the worker level. Havet (2006) took this heterogeneity into account but did not account for the matched aspect of the data: the model should contain unobserved impacts specific to both workplaces and workers.
7. Even at the workplace level, it is also true that few authors examined training structurally, i.e. by clearly identifying the causal relations. Only Dostie and Pelletier (2007) and Kayahan (2006) took into account endogeneity of training decisions at the workplace level and Havet (2006) at the worker level. Chaykowski and Slotsve (2006) took into account simultaneity of decisions regarding classroom and on-the-job training in a longitudinal context. In our view, the causal relations are not completely clear for several variables, including innovation and labour turnover rate. There are also some simultaneity links between training practices and technology use decisions. Indeed, it would be surprising to think that a workplace makes human capital and computer capital investment decisions independently. More structural analysis models would be needed to clarify these links.

8. In part due to the aforementioned gaps, it is difficult to identify economic policy items from the studies done to date. Several studies identified subgroups of establishments or workers who receive less training than the others. Yet before concluding that the training level is suboptimal, it is necessary to have a more accurate sense of the corresponding benefits. This issue could be specifically studied and would be a logical follow-on from our synthesis.

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Bernier, Amélie (2006). “Évaluation du rendement de la formation dans les entreprises canadiennes”, *Communication at the 8th annual Colloque des étudiant(e)s des cycles supérieurs du CRISES*, March 9-10, Concordia University, Montreal.

Chaykowski R. and G. Slotsve (2006). “Firm Provision of Training: Establishment Level Analysis” *Working Paper B-12*, Skills Research Initiative, Human Resources and Skills Development Canada, Industry Canada, Social Sciences and Humanities Research Council of Canada.

Chaykowski, R. and G. Slotsve (2005). “Unionization, Training and Technology Related Skills Development”, *Working Paper B-05*, Skills Research Initiative, Human Resources and Skills Development Canada, Industry Canada, Social Sciences and Humanities Research Council of Canada.

Chaykowski, R. and G. Slotsve (2003). “Employer-Sponsored Training by Firm Size”, *Working Paper B-02*, Skills Research Initiative, Human Resources and Skills Development Canada, Industry Canada, Social Sciences and Humanities Research Council of Canada.

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- Xu, K. (ongoing project) “Duration of Employer-Sponsored Training in Canada”.

Appendix A

Synthesis tables of the results

Table 1 Impact on Training Incidence (INC) and Intensity (INT) at the Firm Level				
Determinants	Causality		Study	Comments
	INC	INT		
Number of competitors	0	0	Dostie and Pelletier (2007)	does not differentiate by competitor source Canadian competition and the rest of the world (except U.S.) (1)
	+		Chaykowski and Slotsve (2006)	
	+	+	Chaykowski and Slotsve (2005)	
		0	Chowhan	
Innovation	+		Turcotte <i>et al</i> (2003)	only for on-the-job training
	+	+	Dostie and Pelletier (2007)	on-the-job training, process improvements
	+	+	Chaykowski and Slotsve (2006)	product or process improvements
	+	+	Chaykowski and Slotsve (2005)	
Use of new technologies	+		Turcotte <i>et al</i> (2003)	
	+	+	Dostie and Pelletier (2007)	
	+	+	Chowhan (2005)	
Labour turnover rate	+	+	Turcotte <i>et al</i> (2003)	
	+	+	Dostie and Pelletier (2007)	on-the-job training only (2)
	+	+	Chaykowski and Slotsve (2006)	
	+	+	Chaykowski and Slotsve (2005)	on-the-job training only (2)
	+	+	Turcotte <i>et al</i> (2003)	on-the-job training only (2)

Table 1 Impact on Training Incidence (INC) and Intensity (INT) at the Firm Level (continued)				
Determinants	Causality		Study	Comments
	INC	INT		
Existence of a collective agreement	0	+	Dostie and Pelletier (2007)	classroom training (pour INT) on-the-job/classroom (2)
	+/-	+	Chaykowski and Slotsve (2005) Chowhan (2005)	
	0	+	Turcotte <i>et al</i> (2003)	
Firm size	+	0	Dostie and Pelletier (2007)	non-linear relationship (3)
	+	-	Chaykowski and Slotsve (2006)	
	+	-	Chaykowski and Slotsve (2005)	
	+	+	Chowhan (2005)	
	+	-	Turcotte <i>et al</i> (2003)	

1. Except for competition from the rest of the world for classroom training and except for Canadian competition in the case of on-the-job training.
2. Intensity increases for all types of training.
3. Large firms train a larger share of employees than medium-sized firms but less than small ones.

Table 2 Impact on Training Incidence at the Employee Level			
Determinants	Causality	Study	Comments
Permanent employee	0 +	Havet (2006) Gagnon and Doray (2005)	only for classroom training
Firm size	+ + -	Havet (2006) Belzil and Hansen (2006) Gagnon and Doray (2005)	only for classroom training only for classroom training
Non-profit	0 +	Havet (2006) Belzil and Hansen (2005)	
Women	0 0 0	Havet (2006) Belzil and Hansen (2005) Gagnon and Doray (2005)	
Age	0 - -	Havet (2006) Belzil and Hansen (2006) Gagnon and Doray (2005)	includes experience and experience squared
Education	+/0 +/0 +	Havet (2006) Belzil and Hansen (2006) Gagnon and Doray (2005)	classroom/on the job classroom/on the job
Unionization	0 +	Havet (2006) Gagnon and Doray (2005)	classroom

Table 2 Impact on Training Incidence at the Employee Level (continued)			
Determinants	Causality	Study	Comments
Immigrants	0	Belzil and Hansen (2006)	
	-	Gagnon and Doray (2005)	
	-	Yoshida and Smith (2005)	
	-	Lochhead (2002)	WES (1999)
Technology use	+	Havet (2006)	
	+	Belzil and Hansen (2006)	
	+	Gagnon and Doray (2005)	computer use only

Table 3
Version of the WES Used

Longitudinal or Cross-sectional Studies?	
Study	Years
Belzil and Hansen (2006)	2001
Bernier (2006)	(-)
Chaykowski and Slotsve (2006)	1999-2002
Chaykowski and Slotsve (2005)	1999
Chaykowski and Slotsve (2003)	(-)
Chowhan (2005)	1999
Dostie and Pelletier (2007)	1999-2002
Drolet (2002)	1999
Gagnon and Doray (2005)	2001
Havet (2006)	1999-2000
Kayahan (2006)	1999-2002
Leckie <i>et al</i> (2001)	1999
Lin and Tremblay (2003)	(-)
Lochhead (2002)	1999
Morissette and Rosa (2003)	1999-2000
Rabemananjara and Parsley (2006)	2001
Therrien <i>et al</i> (2003)	1999
Turcotte <i>et al</i> (2003)	1999
Turcotte and Rennison (2004a)	1999
Turcotte and Rennison (2004b)	1999
Wannell and Ali (2002)	1999
Yoshida and Smith (2005)	1999-2000
(-) Descriptive statistics or results from other studies.	

