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The Relationship Between Training and Firm Performance: A Literature Review

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Buyens

ABSTRACT

Although there are many advocates of training and its important role in improving firm performance, it has been criticised as faddish, or too expensive and not transferring to the job. In fact, some studies have failed to find the impacts of training on firm performance. This article aims to advance understanding of the effects of training on firm performance by reviewing theory and previous empirical studies on the

relationship between training and firm performance. The paper aims to describe the important theoretical approaches and proposes a framework for analysing training and firm performance issues. Data from previous studies are used to assess the effects of training on firm performance. The analysis indicates that the relationship between training and firm performance may be mediated by employee knowledge and attitude. Furthermore, capital investment or organisational strategy does moderate the training performance relationship. Finally, the article discusses and identifies the limitations of previous studies and directions for future research on this topic.

INTRODUCTION

Training is designed to provide learners with the knowledge and skills needed for their present job (Fitzgerald 1992) because few people come to the job with the complete knowledge and experience necessary to perform their assigned job. Becker (1962) provides a systematic explanation of investment in

human capital and associated productivity, wages, and mobility of workers. Such investment not only creates competitive advantages for an organisation (Salas & Cannon-Bowers 2001), but also provides innovations and opportunities to learn new technologies and improve employee skills, knowledge and firm performance. In fact, there is an increasing awareness in organisations that the investment in training could improve organisational performance in terms of increased sales and productivity, enhanced quality and market share, reduced turnover, absence and conflict, (e.g., Huselid 1995, Martocchio & Baldwin 1997, Salas & Cannon-Bowers 2000). In contrast, training has been criticised as faddish, or too expensive (Salas & Cannon-Bowers 2000, Kraiger, McLinden & Casper 2004), and there is an increasing scepticism about the practice and theoretical underpinning of linking training with firm performance (Alliger, et al. 1997, Wright & Geroy 2001).

Studies undertaken so far on training and firm performance relationship can be characterised as follows. Despite a large number of single country studies that have estimated the effects of training on firm performance (e.g., Bishop 1991, Black & Lynch 1996, Bassi & Van Buren 1998, Boon & van der Eijken 1998, Fey, Bjorkman & Pavlovskaya 2000, Faems, et al. 2005, Zwick 2006), it is unclear whether the scientific theme of this research has been adequate. Moreover, it has been difficult to find strong evidence of this theme in the human resource literature, especially at the organisational level of analysis. Therefore, the major purpose of this paper is 1) to review the emergence and attributes of the relationship between training and firm performance, 2) to develop and propose a theoretical framework to fulfil requirement for analysing training and firm performance issues, and 3) to analyse the relationship in both the theory and practice of the management of organisations in order to understand why it has been readily supported as well as criticised by so many researchers and organisations.

This review is organised as follows. First, the article

summarises some characteristics of general and specific training, describes theoretical models linking training to firm performance, and develops and proposes a framework for analysing training and firm performance issues. Second, the paper reviews the studies that have estimated the effect of training on firm performance by using firm level data of a large sample of firms or detailed data from one specific company. This study focus on research published from 1991 to 2007. Third, in explanation of the review results the article briefly summarises advantages and disadvantages of both the approaches using data from a large sample of firms and of one specific company, as well as measuring the effect on firm performance. The paper also summarises how previous studies have measured and estimated the impact of training on firm performance. Finally, the article discusses theoretical and methodological issues, limitations of prior studies, and managerial implications for practitioners as well as providing suggestions and directions for future research on this topic.

THEORETICAL FRAMEWORK

General and Specific Training

The importance of general and specific training is recognised by everyone. Chapman (1993) has pointed out that a major development in the theory of training is the distinction between training relevant to a wide variety of tasks and training which is more specific to the job and firm—general training and specific training. General training raises a worker's future productivity not only in the firm providing it, but also in other firms in the labour market. Becker (1962) argued that workers rather than firms should pay the cost of general training because the employers would not be able to capture any future return on their investment. Therefore, general training may be arranged in a formal education group because it is valuable to a wide range of employers and can be obtained in other ways than training in the firms. The firm should only pay for the firm specific component

of training which does not help the worker receive higher wages elsewhere. In contrast, specific training raises the worker's productivity only in the firm providing it either because they have special methods or because they use equipment with which workers must become familiar. The returns on specific training might be lost when the relationship between employer and worker dissolves. Thus, specific training is clearly associated with turnover. When employers expect workers to be with the firm for a long time, they will offer training for workers since there is a longer period in which the firm can receive returns from their investment.

Bishop (1991) has questioned Becker's human capital theory whereby the worker pays the full costs of and receives all the benefits of general training that is useful at another firm. His research shows that there are some reasons for the employer to share the costs of general training with the worker. The most important reason why firms share general training costs is government regulation. Workers can pay for general training by receiving reduced wages during the training period. However, wage reduction during the general training would probably be forbidden by wage and hours regulations because of minimum wage constraints. When undergoing technological change and pressured by competitors a firm must decide whether to provide general training under minimum wage constraints and predetermined wage structure. Besides the existence of a liquidity constraint, employers may voluntarily pay for general training because of the unwillingness of most workers to pay large amounts of general training. Therefore, firms will offer an optimal to induce workers to undertake general training by sharing the costs of training.

Firm training depends on job characteristics, firm characteristics and worker characteristics. Black and Lynch (1996) summarised the differences between workers who receive formal training and those who do not. Workers are more likely to receive training if their jobs have the following characteristics: high value added jobs where the individual has great

responsibility, cognitively complex jobs (e.g., professional, technical and managerial jobs), sales jobs for complicated, changing and customised products, use expensive machinery on their job, regular, non temporary jobs, full time jobs, and jobs where the skills learned are not useful at many other firms in the community. Holding other worker characteristics constant, the likelihood and the amount of formal training in a given year for workers depend on the characteristics of the jobs they hold, the firms for whom they work, as well as the characteristics of the workers themselves. Therefore, firms usually analyse the training needs to determine where training is needed and who needs to be trained.

Theoretical Models Linking Training to Firm Performance

The knowledge and skills of workers acquired through training have become important in the face of the increasingly rapid changes in technology, products, and systems. Most organisations invest in training because they believe that higher performance will result (Alliger, et al. 1997, Kozlowski, et al. 2000). However, the theoretical framework for the relationship between training and firm performance has been subject to considerable debate. Devanna, Formbrun and Tichy (1984) proposed a model which emphasises the interrelatedness and coherence of human resource management (HRM) policies and performance. According to their model, training and other HRM activities aim to increase individual performance, which is believed to lead to higher firm performance.

Guest (1987) developed a theoretical framework to show how HRM policies can affect human resources and organisational outcomes. The strength of Guest's model is it is a valuable analytical framework for studying the relationship between HRM policies and organisational performance, because it expresses pathways for more careful, clear and ease of empirical testing. He saw commitment as a vital outcome,

concerned with the goals linking employees with firm performance as the goal of quality is important to ensure the high quality of products and services. Therefore, training and development policy play an importance role in HRM and contribute to improved strategic integration, employee commitment, flexibility and quality. HRM outcomes can then lead to high job performance, high problem solving activity, high cost effectiveness, and low turnover, reduced absences and fewer grievances.

Another theoretical framework which emphasises the interrelatedness and the coherence of HR practices, firm strategy and firm level outcomes is presented by Wright and McMahan (1992). They present six theoretical models from the fields of organisational theory, finance and economics. Three of them (resource based view of the firm, cybernetic systems, and behavioural perspective) consider the relationship between training and firm performance.

First, is the resource based view. Firm resources include physical capital, human capital and organisational capital that enable the firm to improve its efficiency and effectiveness. Its resources determine the strength of a firm in the long term. In order for a firm's resources to provide sustained competitive advantages, however, they must have four attributes: 1) valuable, 2) rare, 3) imperfectly imitable, and 4) cannot be replaced with another resource by competing companies (Barney 1991). Therefore, human capital is a primary source of sustained competitive advantage to a firm because apart from the four listed criteria it cannot be duplicated or bought in the market by competitors. Applying the resource based view to training suggests that training can provide knowledge and skills for employees and in turn this may lead to high firm performance.

Second, are the behavioural perspective models. Employee behaviour plays an important role as a mediator between strategy and firm performance (Schuler & Jackson 1987, Schuler 1989). The models do not focus on knowledge, skills or abilities of employees, but focus only on employee role

behaviours because the employee's attitudes, behaviours and commitments could affect the firm performance. Thus, the employee role behaviour can be instrumental in the creation of a competitive advantage. HRM practices can be considered as an option to promote the role behaviour more efficiently and effectively, especially HR training policy.

Third, a popular theoretical model applied to HRM literature is a cybernetic model of HR systems. It is based on the general systems models and includes input from the environment (i.e., inputs of HR knowledge, skills, and abilities), throughput (HR behaviours) and output systems (productivity, sale, job satisfaction and turnover). When the model is applied to strategic HRM, Wright and Snell (1991) focus on two major responsibilities: competence management (deals with individual skills required to implement a given organisational strategy) and behaviour management (activities that seek to agree and coordinate attitude and behaviour of individuals for organisational strategy and goals). Therefore, training will improve knowledge, skills, abilities and the behaviour of employees. This in turn leads to positive organisational outcomes.

Recently, an excellent analytical framework, which uses a multi level approach to training, has been offered by Kozlowski and Klein (2000). The multi level model bridges the gap between theoretical models of training needs assessment, design, and evaluation, and the higher levels at which training must have an impact if it is to contribute to organisational effectiveness (Kozlowski & Salas 1997). The model is focused on training transfer and is embedded in two distinct transfer types: horizontal and vertical transfer. Horizontal transfer concentrates on traditional models of training effectiveness. Kozlowski and Klein (2000) proposed 'top down contextual effects' which they described as a group and organisational factors, that can have direct and moderating effects on learning and transfer. These effects have been the source of recent theory and research addressing the influence of organisational

factors on motivation to learn, transfer, and training effectiveness at the individual level of analysis. Vertical transfer examines the link between individual training outcomes and organisational outcomes. There are two distinctive forms of vertical transfer processes—composition and compilation. Composition concentrates on individual contribution at the same content, while compilation focuses on individual contribution at the different or diverse content.

To summarise, first, it is obvious that similarities exist between the normative models of HRM, whether it is the United State of America (U.S.) perspective (Devanna, et al. 1984), or the British model (Guest 1987). These authors have put training on a set of HRM policies and consider training as an important and vital policy for improving knowledge, skills, attitude and motivation of employees. Second, the HR system is a complex set of policies designed to manage labour in the organisation and integrate into organisational strategy in order to create high performance for an organisation. Third, this review of theoretical models linking training to firm performance also suggests that it is explicitly recognised that no organisation can attain its goals or organisational strategy without labour that has the right knowledge, skills, abilities, behaviour, and attitudes. Therefore, training plays an important role in improving the quality of employees directly and effecting on firm performance through HR outcomes. Finally, organisational researchers studying training and firm performance need to consider the impact of various dimensions of employee training programmes, the type of training methods and design, the type of employees trained, and time spent by employees in training on the topic of firm performance.

A Framework for Analysing Training and Firm Performance Issues

Kozlowski, et al. (2000) suggests an approach to organisation improvement and development based on

enhancing the knowledge, skills and attitudes or abilities of the workforce. This paradigm may be accomplished through training activities. From this perspective, training is effective to the extent that it directly contributes to the strategy, objectives, or outcomes central to organisational effectiveness. The theoretical frameworks are not, however, adequately addressed in current models. Thus, a theoretical model is proposed in the hope that it will assist in understanding the relationship between training and firm performance.

To contribute to the theoretical literature, a theoretical framework was developed and proposed to fulfill the requirement for analysing training and firm performance issues. This framework is shown in Figure 1 and Figure 2. Figure 1 is based on the fundamental premises of training processes, HR outcomes and firm performance. Training is predicated on contributing to higher level group and organisational objectives, results and performance. A number of HR outcomes and firm performance, which are important in analysing the relationship, are enumerated in the second and third box. Attention is drawn to some of the critical variables. Figure 1 shows that training affects the overall knowledge, skills, abilities, attitudes, behaviours, and motivation of employees. HR outcomes have a direct impact on firm performance. In Figure 2 this framework is more complex than that in Figure 1 because it implies interactions between training and organisational strategies, and how these strategies relate to training and firm performance relationships.

Figure 1

A framework for analysing training and firm performance issues

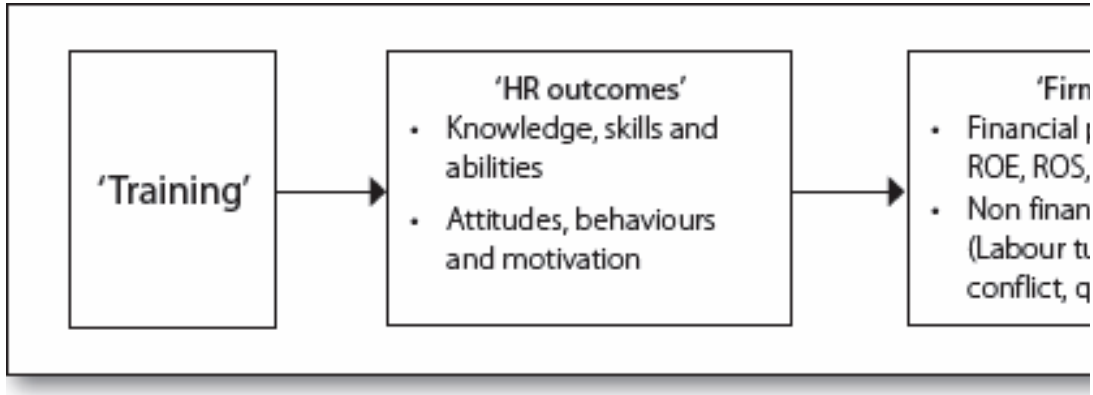
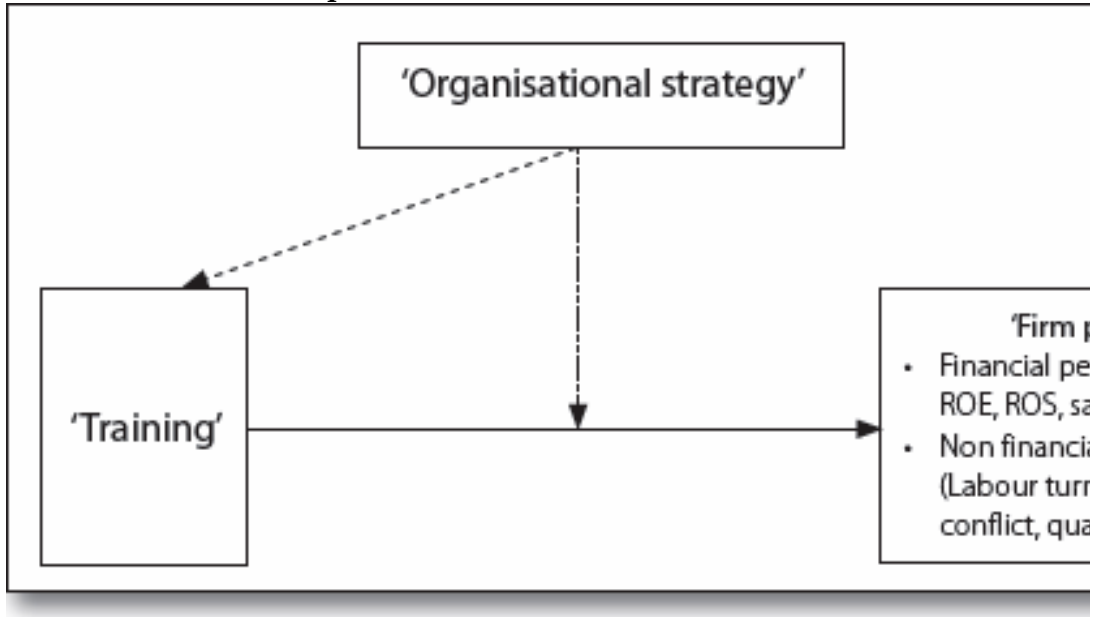


Figure 2

Training, organisational strategy, and firm performance



In the long run, striving to enhance HR outcomes will lead to favourable consequences for firm performance (i.e., financial and non financial performance). Therefore, to determine whether training enhances the performance of the organisation, financial performance, or non financial performance, a process of HR outcomes and firm performance assessment must be considered together in real situations in order to reach a consensus on its meaning. With respect to the performance being used in this model a distinction can be made between financial and non financial performance. Financial performance in this context is linked to indicators like return on investment (ROI), return on assets (ROA), return on equity (ROE), return on sales (ROS), Tobin's q, sales, market share and productivity. Non financial performance includes labour turnover, absence of employees, conflict, quality of product, service and innovation.

METHOD

Sample

In review presented in this paper the focus is mainly on research published in many different journals across a number of disciplines from 1991 to 2007, that have assessed the relationship between training and firm performance. Major psychological, managerial, or business journals (e.g., Personnel Psychology, Labour Economics, Industrial Relations, International Journal of Human Resource Management and Journal of Operational Management) and books (American Society for Training and Development) were scanned for articles containing related information and data. In total, 66 studies were found that could be used for this purpose. All of the identified studies are presented in Table 1.

Table 1

The studies of the relationship between training and firm performance

No	Author/study	Sample size	Response rate (%)	Firm performance
A. Data from a large sample of heterogeneous firms				
1	Ahmad & Schroeder (2003)	107	60	Training has positive effects on employee's commitment ($r = .52^{**}$) and perceived operational performance ($r = .37^{**}$).
2	Aragon-Sanchez, et al. (2003)	457	9	Training has positive effects on quality (5 items, $a = .73$).
3	Ballot, Fakhfakh & Taymaz (2001)	290	Archival data	Training led to increase ROI (288% for France and 441% for Sweden)

4	Ballot, et al. (2006)	350	Archival data	Training has positive effects on value added per worker (17.3% for France and 7.3% for Sweden).
5	Barrett & O'Connell (2001)	215	33.5	General training has a significant positive effect on productivity growth ($r = .14^{**}$).
6	Bartel (1994)	495	Archival data	Implementation of formal training raised productivity by 6 % per year.
7	Barling, Weber & Kelloway (1996)	20	N/A	Training led to increase on credit card sales ($r = .30$) and personal loan sales ($r = .40^*$)
8	Bernthal & Wellins (2006)	127	Convenience sample	Training has positive effects on operating cash flow/net sales, operating cash flow/ total assets, profit margin, ROA, ROE (global benchmarking study)
9	Birley & Westhead (1990)	249	Archival data	Training raised sales ($r = .27^{**}$) of the companies 100 hours of formal training for new hire led to increased

10	Bishop (1991)	2,594	75	ROI ranged from 11% to 38% and has positive effect on turnover. 10 % increase in average education will lead to an 8.5 % increase in productivity in manufacturing and a 12.7 % in non-manufacturing.
11	Black & Lynch (1996)	2,945	64	Training raised value added per employee and gross output.
12	Boon & van der Eijken (1998)	173	N/A	Training led to increase on sales, income, and firm present value.
13	Bracker & Cohen (1992)	73	45	Training has positive effects on sales per worker, productivity, labor efficiency.
14	Cappelli & Neumark (2001)	1,304	72	Training has positive effects on turnover, labor productivity, and ROA.
15	Cho, et al. (2006)	78	36	Training has positive effects on firm performance ($r = .06^*$) and market share ($r = .19^{**}$).
16	Delaney & Huselid (1996)	590	65	Training raised export intensity

17	Deng, Menguc & Benson (2003)	97	54	and average export sale growth over three years ($r = .17^{**}$). Training has positive effects on new sales revenue ($r = .16^*$), productivity ($r = .21^*$), customer satisfaction, quality and speed ($r = .27^*$). Training has positive effects on net profitability ($r = .10$), voluntary turnover ($r = .03$), and productivity ($r = .15^{**}$).
18	Ely (2004)	486	100	Technical and non-technical training has positive effects on overall firm performance ($r = .44^{**}$, nonmanagerial and $r = .48^{**}$, managerial) Technical and non-technical training has positive effects on HR outcome ($r = .23^*$ to $.51^*$) & overall firm performance (r
19	Faems, et al. (2005)	416	28	
20	Fey & Bjorkman (2001)	101	28	
21	Fey, et al. (2000)	101	28	

				= .22* to .26*).
22	Garcia (2005)	78	19	Training led to sales per employee, employee satisfaction (a = .79), client satisfaction (a = .70), owner/ shareholder satisfaction (a = .71).
23	Gelade & Ivery (2003)	137	49	Training has positive effects on sales (r = .19**), clerical accuracy (r = .18**), and customer satisfaction (r = .37**).
24	Ghebregiorgis & Karsten (2007)	82	42	Training has positive effects on sales per employee (r = -.01), grievances (r = .05), voluntary turnover (r = .25*), and absenteeism (r = -.01).
25	Guerrero & Barraud-Didier (2004)	180	12	Training has positive effects on productivity (r = -.02), objective profitability (r = -.04), and product & services quality (r = .10*).
26	Harel & Tzafrir (1999)	76	35	Training raised market share (r = .53**).

27	Horgan & Muhlau (2006)	392	5	Training has positive effects on work performance, cooperation, and discipline.
28	Huang (2000)	315	36	Training has positive effects on sale growth, profit growth, ROI, ROS, turnover, and market share.
29	Ichniowski, et al. (1997)	36	60	Training has positive effects on production line uptime and overall customer satisfaction ($r = .44^{**}$).
30	Kalleberg & Moody (1994)	688	Archival data	Training has positive effects on market share ($r = .22^{**}$), product quality ($r = .18^{**}$), customer satisfaction ($r = -.01$), and employee relations ($r = .10^{**}$).
31	Katou & Budhwar (2007)	178	30	Training has positive effects on perceived effectiveness ($r = .56^{**}$), efficiency ($r = .57^{**}$), innovation ($r = .53^{**}$), and product quality ($r = .46^{**}$).

32	Khatri (2000)	194	24	Training has positive effects on sales growth ($r = .08$), profit margin ($r = .17^{**}$), and perceived performance ($r = .18^{**}$)
33	Kintana, Alonso & Olaverri (2006)	956	17	Training has positive effects on productivity ($r = .04$).
34	Koch & McGrath (1996)	319	7	Training has positive effects on sales per employee.
35	Lawler, et al. (1998)	491	26	Training has positive effects on productivity, customer satisfaction, quality and speed ($r = .13^*$ to $.28^*$), profitability and competitiveness ($r = .16^*$ to $.33^*$).
36	Lyau & Pucel (1995)	131	55	Training led to increase value added per employee and sales per employee.
37	Mabey & Ramirez (2005)	179	N/A	Varies by training type led to increase operating revenue per employee and reduce cost of employee ($r = .05$ to $.19^*$). Training has

38	Martell & Carroll (1995)	115	26	positive effects on perceived business unit performance ($r = .15^{**}$).
39	Meschi & Metais (1998)	102	44	Training led to increase return on investment.
40	Newkirk-Moore & Bracker (1998)	152	49	Training led to raise ROA, ROE, overhead, spread, and mixed results.
41	Ng & Siu (2004)	485	62	1 percent increase in managerial training induced increase in sales from 0.13 to 0.32 percent
42	Ngo, et al. (1998)	253	20	Training has positive effects on perceived competitive sales ($r = .21^{**}$), new product development ($r = .35^{**}$), competitive net profit ($r = .31^{**}$), employee satisfaction ($r = .32^{**}$).
43	Paul & Anantharaman (2003)	34	76	Training has positive effects on ROI ($r = .20^{**}$), net profit, sale, productivity, quality ($r = .29^{**}$), speed of delivery ($r = .12^{**}$),

				operating cost ($r = .22^{**}$), competence ($r = .58^{**}$), and employee commitment ($r = .43^{**}$).
44	Rodriguez & Ventura (2003)	120	5.4	Training has positive effects on ROA, total sales growth, sales per employee, and turnover.
45	Shaw, et al. (1998)	227	36	Training has positive effects on voluntary turnover ($r = .19^{**}$).
46	Storey (2002)	314	22	Training led to raise GRATE ($r = .01$ to $.15^*$), cash flow ($r = .06$ to $.14^*$), and profitability.
47	Thang & Quang (2005)	137	9	There is a positive association of training and development with perceived market ($r = .33^{**}$) and firm performance ($r = .45^{**}$).
48	Tzafrir (2005)	104	38	There is a positive association of training and development with perceived market ($r = .47^{**}$) and firm

				performance ($r = .66^{**}$).
49	Vandenberg, Richardson & Eastman (1999)	49	100	Training has positive effects on ROE ($r = .02$) and turnover ($r = -.30^*$).
50	Wiley (1991)	200	100	Training has positive effects on store net sales ($r = -.40^{**}$) and customer satisfaction ($r = .31^{**}$)
51	Zheng, Morrison & O'Neill (2006)	74	22	Training has positive effects on competency, turnover, and employee commitment.
52	Zwick (2006)	2,079	Archival data	1 percent increase in training in 1997 could increase average productivity in the period 1998-2001 by more than 0.7 percent.

B. Data from a specific company survey

53	Bartel (1995)	1	1	Training was found to have a positive and significant effect on ROI (49.7 %), job performance, and productivity. Reading, writing, and math has
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54	Krueger & Rouse (1998)	2	2	positive effect on ROI (7 %) in manufacturing company, turnover, absenteeism, and job performance in both manufacturing and service company.
55	Pine & Judith (1993)/ The Garrett Engine	1	1	Team work training led to increase ROI (125 %) and have positive effects to equipment downtime.
56	Phillips (1994)/ Information Serv. Inc	1	1	Interpersonal skills training led to increase ROI (336 %) and have positive effects to behaviors.
57	Phillips (1994)/ Financial Serv. Co.	1	1	Selection training led to increase ROI (2,140 %) and reduction in turnover of branch manager trainees.
58	Phillips (1994)/ U.S government	1	1	Supervisory skills training led to increase ROI (150%) and have positive effects on the skills. Customer

59	Phillips (1994)/ Midwest Banking	1	1	lending training led to increase ROI (1,988 %) and net profit per loan.
60	Phillips (1994)/ Multi-Marques	1	1	Time management training led to increase ROI (215 %)
61	Phillips (1994)/ Coca Cola bottling Co. in San Antonio	1	1	Motivation, perform, and appraisal training led to increase ROI (1,447 %) and sales, reduced waste and absenteeism.
62	Carnevale & Schulz (1990)/ Vulcan Materials	1	1	Supervisory skills training led to increase ROI (400 %) and have positive effects on production worker turnover.
63	Phillips (1994)/ Yellow Freight System	1	1	Performance appraisal training led to increase ROI (1,115 %).
64	Phillips (1994)/ International Oil Co.	1	1	Customer services training led to increase ROI (501 %) and have positive effects on tracked pullout costs and customer complaints. Literacy skills

65	Phillips (1994)/ Magnavox Electronic Systems	1	1	training led to increase ROI (741 %) and have positive effects on tracked average monthly efficiency.
66	Phillips (1994)/ Arthur Andersen & Co.	1	1	Tax professionals training led to increase ROI (100 %), and have positive effects on tracked fees and chargeable hours.

The measurement of training and firm performance varied across the studies. Some studies use a single item to measure training or performance, whereas others use multiple training and firm performance measures. For example, Zwick (2006) used data on 2079 establishments from the Germany Institute for Employment Research to analyse of the impact of training intensity on establishment productivity, whereas Krueger and Rouse (1998) used data on two companies, a manufacturing company and a service company, to estimate the effect of reading, writing and mathematics training on ROI, turnover, absenteeism and job performance. Therefore, there are a number of challenges in reviewing the results of these studies because of a lack of consistency in their calculation and measurements.

Procedure

To develop an integrated view on empirical evidence for the effects of training on firm performance, this article used selective and descriptive analysis. This action followed opportunity to reanalyse the data from the previous studies. For comparative reasons, the article divided previous studies into two groups: 1) previous studies using data from a large sample of

heterogeneous firms, and 2) previous studies using data from a specific company survey. In the first group, there are 52 studies for the study review. The studies of this group have estimated the impact on training on firm performance by using firm level data collected through mail, phone surveys or archival data. In the second group, 14 were found to assess the relationship between training and firm performance. All these studies collected primary data from the company's personnel files or human resource departments. Some of these studies held face to face interviews with managers to understand what type of training the companies conducted and how the companies are measured, analysed or evaluated training results.

With respect to firm performance the article aimed to extract clear empirical evidence and discussions on the unique effects of training on firm performance. Firm performance in the studies was reduced into two categories: 1) financial firm performance (ROI, sales, productivity, profit, market share), and 2) non financial firm performance (turnover, absenteeism, job satisfaction, motivation). However, some studies measured both financial and non financial indicators at the same time. Clarifying the understanding training and financial performance (or non financial performance) from the current literature and proposed directions for future research on this topic was undertaken.

RESULTS

Results from the Studies of Large Samples of Firms

In this section 52 studies that have estimated the impact of training on firm performance by using firm level data from a large sample of firms are reported. The advantage of the previous studies is that it could be generalised to other companies, whereas a case study could not express the problem in general. The statistics in part A of Table 1 show that most studies

frequently estimated the effects of training on financial performance (47 studies or 90% of the total studies used a large sample of firms), followed by both financial performance and non financial performance (25 studies or 48% of the total studies used a large sample of firms) and non financial performance (five studies or 10% of the total studies used a large sample of firms).

With respect to performance measurement methods some researchers (Bishop 1991, Bassi & Van Buren 1998, Fey, et al. 2000), who estimated the effects of training on firm performance, have used a subjective measure of performance. The disadvantage of a subjective measure is that research results are non comparable across companies over time and depend on many assumptions. For example, Bishop (1991) used data on 2594 employers for his study, and then generated tentative estimates of both the opportunity costs and the productivity effects of training. Thus, the reliability of these estimates depends on the accuracy of the assumption regarding the cost of training, as well as the accuracy of the subjective estimates of firm performance (Bartel 2000).

In order to overcome the limitations of subjective measures of performance other researchers (Black & Lynch, 1996, Boon & van der Eijken 1998, Faems, et al. 2005, Zwick 2006) have used a firm level data set in a regression standard Cobb-Douglas production function to estimate the impact of training on firm performance. They have measured firm performance by net sales or value added. More specifically, Black and Lynch (1996) used data from the National Center on the Educational Quality of the Workforce (EQW) National Employers' Survey and measured productivity by net sales, estimating a production function in which the dependent variable was sales, receipts or shipments. In contrast Faems, et al. (2005) studied the effect of individual HR domains on financial performance by using survey data from 416 small and medium companies and measured productivity by value added.

The kinds of training used for estimation differ

throughout the studies. For instance, Barrett and O'Connell (2001) estimated the productivity effects of general training, specific training, and all types of training combined. They found that general training was more related to sales growth when the firms had greater investment in capital than less. Alternatively, Ahmad and Schroeder (2003) estimated the effects of training in job skills and cross training on operational firm performance. Their results showed that training was only related to operational performance through its effect on organisational commitment within the plants, whereas Fey, et al. (2000) concentrated on the influence of technical and non technical training on overall firm performance.

As regards the kinds of establishment assessed in the previously reported studies, Black and Lynch (1996) divided companies into two groups: manufacturing companies and non manufacturing companies. Ng and Siu (2004) collected data from 800 state owned manufacturing enterprises and non state owned manufacturing enterprises from a survey in Shanghai to assess the effects of training on firm performance. Faems, et al. (2005) estimated the impacts of training on firm performance of small and medium companies. Other authors used data from companies in a specific industry for their estimation. For instance, Ichniowski, Shaw and Prennushi (1997) collected data from 41 steel production lines in Japan and the U.S., whereas Paul and Anantharaman (2003) collected data from 34 companies in the Indian software industry.

To summarise, the review of previous studies of large samples of firms provides an interesting picture of the relationship between training and firm performance. The authors of this article tried to capture the effect of training on firm performance by distinguishing kinds of training, companies, firm performance, using firm level data from one or several sectors and different ways to measure performance. They might not, however, accurately control for data, complex production processes, and other factors (e.g., new technology, a change in products, or labour market conditions) besides training.

Results from the Case Studies

A total of 14 case studies, that estimated the influence of training on firm performance, was collected for review purposes. The types of training differ across the studies. For example, Krueger and Rouse (1998) examined the effects of reading, writing and mathematics training on ROI, turnover, absenteeism and job performance, whereas Phillips (1994), in the case of the Coca Cola bottling company of San Antonio, estimated the impact of motivation, performance and appraisal training on ROI, sales, reduced waste and absenteeism. ROI is one of the firm financial indicators and appears in 100 per cent of the case studies in this section. It could also mean that training decisions depend a lot on a return to this form of human capital investment. A summary of training types and firm performance indicators of the fourteen case studies and major findings are presented in part B of Table 1.

All these case studies collected direct data from company records. The estimation methods of the impact of training on firm performance vary, however, among these case studies. For instance, Bartel (1995), and Krueger and Rouse (1998) estimated the influence