



the Autonomous Management School of  
Ghent University and Katholieke Universiteit Leuven

**Vlerick Leuven Gent Working Paper Series 2009/01**

**WHAT WE KNOW ABOUT RELATIONSHIP BETWEEN TRAINING AND FIRM  
PERFORMANCE: A REVIEW OF LITERATURE**

NGUYEN NGOC THANG

DIRK BUYENS

Dirk.Buyens@vlerick.be

**WHAT WE KNOW ABOUT RELATIONSHIP BETWEEN TRAINING AND FIRM  
PERFORMANCE: A REVIEW OF LITERATURE**

NGUYEN NGOC THANG

Faculty of Economic and Business Administration, Ghent University

DIRK BUYENS

Vlerick Leuven Gent Management School

**Contact:**

Dirk Buyens

Vlerick Leuven Gent Management School

Tel: +32 09 210 97 22

Fax: +32 09 210 97 00

Email: Dirk.Buyens @vlerick.be

## **ABSTRACT**

This paper review theory and empirical findings on the relationship between training and firm performance. We describe the various important theoretical approaches and proposed a framework for analyzing training and firm performance issues. Data from previous studies is used to assess the effects of training on firm performance. The research results show that training has positive and significant impact on firm performance. Finally, we identify the limitations of these previous studies and directions for future research on this topic.

Keywords: Training; Human resource outcomes; Firm performance

## 1. INTRODUCTION

Training is designed to provide learners with the knowledge and skills needed for their present job (Fitzgerald, 1992) because few people are hired with the complete knowledge and experience necessary to perform the job. Becker (1962) provides a systematic explanation of investment in human capital and associated productivity, wages, and mobility of workers. The investment has not only created competitive advantages for an organization (Salas & Cannon-Bowers, 2001), but also provides innovations and learning new technologies and improve employee skills, knowledge and firm performance. In fact, there is an increasing concern in organizations that the investment in training in order to improve organizational performance such as increased sales and productivity, enhanced quality and market share, reduced turnover, absence and conflict, (e.g. Huselid 1995; Martocchio & Baldwin 1997; Salas et al 2000).

While there are many advocates of training and its important role in improving firm performance, training has been criticized and called faddish, too expensive (Kraiger et al., 2004; Salas, E & Cannon-Bowers, J.A., 2000), and there is an increasing skepticism about the practice and theoretical underpinning of linking training with firm performance (Alliger et al., 1997; Wright & Geroy, 2001). Therefore, the major purpose of this paper is to examine the emergence and attributes of the relationship between training and firm performance. After that we analyze the relation in both the theory and practice of the management of organizations in order to understanding why it has been readily supported, as well as criticized by many researchers and organizations.

In this study, we focus on research published from 1991 to 2007. Our review is organized as follows. First, we summarized some characteristics of general and specific training, describe theoretical models linking training to firm performance, and developed and proposed a framework for analyzing 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 large sample of firms or detailed data from one specific company.

Third, in explaining our results, we briefly review advantage and disadvantage of both approaches using data from large sample of firms and of one specific company, as well as measure the effect firm performance. In this part, we also summarized how prior studies has measured and estimated the impact of training on firm performance. Finally, we turn our discussion and conclusion to theoretical and methodological issues, limitations of prior studies, and managerial implications for practitioners. After that we provide suggestions and directions for future research on this topic.

## **2. THEORETICAL FRAMEWORK**

### **2.1. General and specific training**

The importance of general and specific training is recognized by everyone. Chapman (1993) has pointed that a major development in the theory of training came with the distinction between training relevant to a wide variety of tasks and training which more specific to the job and firm - general training and specific training. General training that raises a worker's future productivity not only in the firm providing it, but also at other firms in the labor market. Becker (1962) argued that workers rather than firms would bear the cost of general training because the employers providing completely general will not be able to capture any of future return of their investments. 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 because they have either special methods or because of equipment with which workers must become familiar. The returns to 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 a long time, they will offer training for workers since there is a longer period to receive returns from their investment.

Bishop (1994) have questioned the human capital theory of Becker that worker pays the full costs of and receive all the benefit of general training that are useful at another firm. His research has showed that there are some reasons on the part of the employer sharing the costs of general training with worker. The most important reason why firms share general training costs is regulations of government. Workers can pay for general training by receive a reduced wages during the training period. However, wage reduction during the general training would probably be forbidden by federal wage and hours regulations because of minimum wage constraints. When under technological change and pressure of competitors, firm must decide whether to provide general training under minimum wage constraints and predetermined wage structure. Beside the existence of a liquidity constraint, employers might 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 share the costs of training.

Firm training depend on the job characteristics, firm characteristics and worker characteristics. Black & Lynch (1996) summarized the differences among 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 customized 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 amount of formal training in a given year varies for workers according to the characteristics of the jobs they hold, the firms for whom they work, as well as the characteristics of the worker themselves. Therefore, firm usually analyzed the training needs to determine where training is needed, what and who needs to be train.

## **2.2. Theoretical models linking training to firm performance**

The knowledge and skills of workers through training have become important as it faces the increasingly rapid changes in technology, products, and systems. Most organizations 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 et al. (1984) proposed a model which emphasizes 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. Thus, the result leads to higher firm performance.

Guest (1987) has developed a theoretical framework to show how HRM policies have effect on human resource and organizational outcomes. The strength of Guest's model is that it is a valuable analytical framework for studying the relationship between HRM policies and organizational performance because the model was expresses more careful, clear and easy for empirically testing. He saw commitment as a vital outcome, concerned with the goals linking employees with firm performance. 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 has been contributing to improve strategic integration, employee commitment, flexibility and quality. HRM outcomes then lead to high job performance, high problem-solving, high cost-effectiveness, and low turnover, absence, and grievances.

Another theoretical model which emphasizes 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 organizational theory, finance, and economics. Three of them (resource-based view of the firm, cybernetic systems, and behavioral perspective) are considering the relationship between training and firm performance.

First, in the resource-based view, firm resources include physical capital, human capital and organizational capital that enable the firm to improve its efficiency and effectiveness. Its resources determine the strength of a firm on the long term. However, in order for a firm's resources to provide sustained competitive advantages, it must have four attributes: valuable, rare, imperfectly imitable, and can not be substituted with another resource by competing companies (Barney 1991).

Therefore, human capital plays a primary source of sustained competitive advantages to a firm because human capital has not only the four criteria but also can not duplicate 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, its might lead to high firm performance.

Second, in behavioral perspective model, employee behavior plays an importance role as the mediator between strategy and firm performance (Schuler & Jackson, 1987; Schuler, 1991). The models do not focus on knowledge, skills or abilities of employees, its focus only on employee role behaviors because the employee's attitudes, behaviors, and commitments might effect the firm performance. The employee role behavior can be an instrumental in the creation of a competitive advantage. Therefore, HRM practices can be considered as an option to promote the role behavior more efficiency and effectiveness, especially HR training policy.

Third, a popular theoretical model applied to HRM literature is cybernetic model of HR system. The models are based on the general systems models and include input from environment (i.e., inputs of HR knowledge, skills, and abilities), throughput (HR behaviors) and output systems (productivity, sale, job satisfaction, turnover, etc.). When applied the model to SHRM, Wright and Snell (1991) focus on two major responsibilities: competence management (deals with individual skills required to implement a given organizational strategy) and behavior management (activities that seek to agree and coordinate attitude and behavior of individuals for organizational strategy and goal). Therefore, training will improve knowledge, skills, abilities and behavior of employees. Thus, in turn, lead to positive organizational outcomes.

Recently, an excellent analytical framework which uses a multilevel approach to training is offered by Kozlowski et al. (2000). The model is to explicate a multi-level model that 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 organizational effectiveness (Kozlowski & Salas, 1997). They focused on training transfer and embedded in two distinct transfer types: horizontal and vertical transfer. Horizontal transfer concentrated on traditional models of training effectiveness. Kozlowski and Klein (2000) proposed "top-down contextual effects" which they described as a group and organizational factors that have direct and moderating effects on learning and transfer. These effects have been the source of recent theory and research addressing the influence of organizational factors on motivation to learn, transfer, and training effectiveness at the individual level of analysis.



Vertical transfer is examined the link between individual training outcomes and organizational outcomes. There are two distinctive forms of vertical transfer processes - composition and compilation. Composition concentrated on individual contribution at the same content, while compilation focused on individual contribution at the different or diverse content.

To summarize, first, it is obvious that similarities exist between the normative models of HRM, whether US (Devanna et al.) or British (Guest model). They have put training on a set of HRM policies and considered training as an importance and vital policy for improving knowledge, skills, attitude and motivation of employee. Second, HR system is a complex set of policies designed to manage labor in the organization and integrate into organizational strategy in order to create high performance for organization. Third, this review of theoretical models linking training to firm performance also suggests that it is explicitly recognized that no organizations can attain its goals or organizational strategy without labor of the right knowledge, skills, abilities, behavior, and attitudes. Therefore, training plays an importance role in improving quality of employees directly and effect on firm performance through HR outcomes. Finally, organizational researchers studying training and firm performance need to consider the impact of various dimensions of employee training programs, the type of training methods and design, the type of employees trained, time spent by employees in training on firm performance.

### **2.3. A framework for analyzing training and firm performance issues**

Kozlowski et al. (2000) suggest that one of the approaches to organization improvement and development are based on enhancing the knowledge, skills, and attitudes or abilities of the workforce. This 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 organizational effectiveness (Jackson & Schuler, 1990). However, the theoretical frameworks are not 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, we develop and proposed a theoretical framework for analyzing training and firm performance issues in figure 1. It is based on the fundamental premises of training processes, HR outcomes and firm performance. Training is predicated on contributing to higher level group and organization objectives, results, and performance. A number of HR outcomes and firm performance which are important in analyzing the relation are enumerated in the second and third box. It does draw attention to some of the critical variables. The figure shows that training effects the overall knowledge, skills, abilities, attitudes, behaviors, and motivation of employees. HR outcomes have a direct impact on firm performance after.

---

Insert Figure 1 About Here

---

In the long run, striving to enhance HR outcomes will lead to favorable consequences for firm performance (i.e., financial and non-financial performance). Therefore, in considering whether training enhance the performance of the organization, financial performance, or non-financial performance, a process of HR outcomes and firm performance assessment must be considered together in real situation in order to reach a consensus on its meaning. With respect to the performance being used in this model, we can make a distinction 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, productivity, etc,. Non-financial performance includes labor turnover, absence of employees, conflict, quality of product and/ or service, innovation, etc.

### **3. METHOD**

#### **3.1. Sample**

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

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

#### **3.2. Analysis**

To develop an integrative view on empirical evidence on the effects of training on firm performance, we used selective and descriptive analysis. This allowed us to reanalyze the data from the studies. For comparative reasons, we divided articles into two groups: articles used data from a large sample of heterogeneous firms and articles used data from a specific company survey. In the first group, there are 52 studies that have been collected for the review. The studies of this group have estimated the impact of training on firm performance by using firm-level data collected through mail, phone surveys, or archival data. In the second group, 14 studies were found that could be used to assess the relationship between training and firm performance.

All these studies collected direct data from the company's personnel files or human resource departments. Some of these studies have face-to-face interview with managers to understand how and what type of training the companies conducted, how the companies are measured, analyzed, or evaluated training results.

With respect to firm performance, we aimed to extract clear empirical evidence and discussions on the unique effects of the training on firm performance. Therefore, we break down firm performance in the studies into two categories: financial firm performance (ROI, sales, productivity, profit, market share, etc.) and non-financial firm performance (turnover, absenteeism, job satisfaction, motivation, etc). However, some studies measured both financial and non financial indicators at the same time. From each category, we will clarify our understanding of the relationship between training and financial performance (or and non-financial performance) from current literature and propose directions for future research on this topic.

## **4. RESULTS**

### **4.1. Results from the studies of large sample of firms**

In this section, we have collected 52 studies that have estimated the impact of training on firm performance by using firm level data from a large sample of firms. The advantage of the studies is that it might generalize to other companies, while the case study could not express the generalization problem. The statistic 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 (5 studies or 10% of the total studies used a large sample of firms).

With respect to performance measurement method, some researchers (Bassi & Van Buren, 1998; Bishop, 1991; Fey et al, 2000; etc.) who have been able to estimate the effects of training on firm performance have used subjective measure of performance. The disadvantage of subjective measure is that researches are not comparable across companies over time and the results depend a lot on assumptions. For example, Bishop (1991) used data on 2594 employers for his study. He 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 his 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 limitation of subjective measure of performance, other researchers (Black & Lynch, 1996; Boon & van der Eijken, 1998; Faems et al., 2005, Zwick, 2006; etc.) have used a firm-level dataset 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 & 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, estimated a production function in which the dependent variable is the sales, receipts, or shipments, while Faems et al (2005) studied the effect of individual HR domain on financial performance by using survey data on 416 small and medium companies and measured productivity by value added.

The kinds of training use for estimation are different through the studies. For instance, Barrett & O'Connell (2001) estimate the productivity effects of general training, specific training, and all types of training combined. Ichniowski et al. (1996) estimated training in production skills, communication and problem solving skills, and a set of other activities in order to improve workers' understanding of production issues on firm performance, while Fey et al (2000) concentrates on the influence of technical and non-technical training on overall firm performance.

For kinds of establishment in the above studies, Black & Lynch (1996) divided companies into two groups: manufacturing companies and non manufacturing companies. Ng & Siu (2004) collected data on 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 medium companies. Others authors used data from companies in a specific industry for their estimation. For instance, Ichniowski et al. (1996) collected data from 41 steel production lines in Japan and U.S., while Paul & Anantharaman (2003) collected data from 34 companies in software industry in Indian.

To summarize, the review of studies of large sample of firms provide an interesting picture on the relation between training and firm performance. The authors tried to capture the effect of training on firm performance by breaking kinds of training, companies, firm performance more details for estimation, using firm-level data from one or several sectors and difference ways to measure performance.

However, these studies might not accurately control of data, complex production processes, and other factors (i.e., new technology, a change in products, or labor market conditions) besides training for estimation.

#### **4.2. Results from the case studies**

Fourteen case studies that estimated the influence of training on firm performance have been collected for review purpose. The types of training are difference cross the studies. For example, Krueger & Rouse (1998) examine the effects of reading, writing, and math training on ROI, turnover, absenteeism, and job performance, while Phillips (1994), in Coca-Cola bottling company of San Antonio case, estimated the impact of motivation, perform, and appraisal training on ROI, sales, reduced waste and absenteeism. ROI is one of the firm financial indicators appears in 100% case studies in this section. It could also mean that training decisions depends a lot on return to this form of human capital investment. A summary of training types and firm performance indicators of fourteen case studies and major findings are presented in part B of table 1.

All these case studies collected direct data from these company records. However, the estimation methods the impact of training on firm performance is various through case studies. Bartel (1995) and Krueger & Rouse (1998) have estimated the influence of training on firm performance by applying an econometric framework to data from these companies. Phillips (1994), in the International Oil case, and Pine & Judith (1993) used the experimental design method to measured actual firm performance (productivity). Experimental method is intelligent method and suitable for these cases because it could be used to successfully quantify the outcomes of training programs from company's files. Other 10 studies used subjective method to measure trainees' performance.

To summarize, the firm case study approach overcomes the problems of the large sample and lack of insufficient data for estimation. In addition, the approach has considered training and measures firm performance more detail as well as to accurately controls other factors besides training (e.g., firm characteristics, new technology) that influence firm performance. Another advantage of the approach (except case studies of Bartel, 1995 and Krueger & Rouse, 1998) is tracking the performance measures over an enough time period in order to reach an exact and reliable assessment.

However, these case studies could not avoid one of some following problems such as companies do not want weak results publicized; using subjective evaluation on trainees' performance; sample selection of trainees for measure and estimation; or design assumptions of these authors.

### **4.3. Training has effects on financial performance**

Based on the framework for analyzing training and firm performance issues in the figure 1, there are 61 studies in table 1 estimated the effects of training on financial performance (or 94% of the total 65 studies). A number of researchers (Ballot et al., 2001; Barrett & O'Connell, 2001; Black & Lynch 1996; Boon & van der Eijken, 1998; Faems et al (2005), Zwick, 2006; etc.) have tried to estimate impact of training on productivity, while other researchers studied the effect of training on sales (Ahmad & Schroeder, 2003; Bassi & Van Buren, 1998; Garcia, 2005; Rodriguez & Ventura, 2003; etc.). For instance, while Ballot (2001) with his colleagues found that training has positive effects on productivity (value added per worker), Bassi & Van Buren (1998) have demonstrated that training led to increase on sales, quality, and customer satisfaction.

Some other studies have examined the influence of training on financial performance indicators such as ROI, ROA, ROE, or market share (Batel, 1995; Bernthal & Wellins, 2006; Bishop, 1994; Delery & Doty, 1996; Huang, 2000; Paul & Anantharaman, 2003; etc.). For example, Bartel (1995) found that training has positive and significant effect on ROI, while Bernthal & Wellins (2006) and Delery & Doty (1996) estimated impact of training on both ROA and ROE indicators. Most of studies are not only an estimate on effect of training on financial performance but also to estimate effect of training on non financial performance at the same time. It may mean that the estimation results of each study depend on the research purpose of authors or research projects, performance measure method, and data collected.

To summarize, the results indicated that there was a significant difference between types of training, types of financial performance indicators, and impacts of training on financial performance indicators through these studies. With 61 studies (94% of the total studies) related to financial performance indicators, these authors seem to concentrate on measured firm performance by financial indicators and all of them demonstrated that training has positive and significant influence on financial indicators.

#### **4.4. Training has effects on non-financial performance**

According to the framework in the figure 1, 36 studies examined the impact of training on non-financial performance (or 55% of the total 65 studies) such as turnover, quality, absenteeism, customer satisfaction, etc. With respect to turnover, Bishop (1991), in his study on newly hires show that formal training led to lower labor turnover, while Krueger & Rouse (1998) reported that reading, writing, and math training has positive effect on turnover. A majority of other studies also found that training has positive effect on labor turnover. It means that turnover has a powerful effect on employer decisions to provide training to employees. High turnover implies that investment in training for their employees is not efficient because many of those trained moved to other companies. Thus, companies may pay quite a high price for this turnover in term of lower sales.

Other studies have estimated impact of training on quality, absenteeism, and customer satisfaction. One possible explanation of why these non-financial performance indicators become more popular in above studies is that when considering the competitive advantages that a firm are thought to possess, it is usually to think about high quality or justify the customer's needs. Thus, many studies tried to measure firm performance by these indicators. For instance, Ghebreorgis & Karsten (2007) and Krueger & Rouse (1998) demonstrated that training has highly effect on absenteeism rate reduction. Aragon-Sanchez et al. (2003) and Katou & Budhwar (2007) found that training has positive effect on quality, while Ely (2004) and Lawler et al. (1998) reported that training has a significant and positive effect on customer satisfaction.

To summarize, it is not surprising that firms invest in training in order to improve non-financial performance. It may mean that some non-financial performance indicators are also play an importance role in organizational strategy. Therefore, a number of studies have estimated and measured the influence of training on non-financial performance. However, when these studies measure the impact of training on non-financial performance by subjective method (e.g., workers' reactions to the training, impact of training on workers' behavior, etc) or these assumptions, the results of these studies could not be totally accurate.



## 5. DISCUSSION AND CONCLUSION

As expected, training has a variety of positive effects on the financial and non financial firm performance. These effects might be much boarder than the findings that were the major results of many previous studies. We believe that these effects have been subject to considerable importance and debate in both the theory and managerial implications. Therefore, we identify and develop potential ideas for discussion and provide suggestions and directions for future research on this topic.

We see a first opportunity for research in the theoretical explanation of why training might contribute to increase firm performance. As presented in the theoretical framework for analyzing training and firm performance issues in figure 1, training has direct improved HR outcomes (e.g., knowledge, skills, abilities, attitudes, behaviors, and motivation of employees). However, by directly linking training with firm performance, almost studies have ignored the potential mediating role of these HR outcomes on the relationship. Thus, an important question is whether training indeed unequivocally effects to HR outcomes, which in turn impacts on firm performance level. We suggests that future research could focus on test mediating effects of HR outcomes, which could be fruitful to further unravel the relationship between training and firm performance.

Second, although the review shows that training has positive and significant effect on firm performance in specific sector (steel and software industry). However, there are only two studies follow by this approach. This is the work by Ichniowski et al. (1996) and Paul & Anantharaman (2003). Respondent research results in other sectors (e.g., food and tobacco, textile and apparel, chemicals and petroleum, banking and finance, etc.) will most probably have different effects or views on the relationship between training and firm performance. Therefore, future research needs to estimate the impact of training on firm performance in other specific sector in order to provide another potentially interesting result on the relationship and contribute to the current literature within the field.

Third, these previous studies have estimated effect of training on firm performance in many specific jobs and countries and its effects will be continued to study in the future.

However, almost these studies have been implemented in developed countries (e.g., Aragon-Sanchez et al. 2003, Barrett & O'Connell, 2001; Bishop, 1991; Faems et al., 2005; etc.), while the relationship between training and organizational performance are not adequately addressed and studied in developing countries. In addition, the impact of training for different types of employees (e.g., worker, supervisor, office staff, manager, etc.) and their performance might vary through job characteristics and locations. Therefore, there is an opportunity for future research to examine the influence of training on firm performance follows job characteristics, as well as the specific country.

Fourth, a number of researchers (e.g., Bishop, 1991; Fey et al, 2000) have used subjective method for their studies, while other studies (e.g. Aragon-Sanchez et al. 2003, Bassi & Van Buren, 1998; Rodriguez & Ventura, 2003) have low response rate of questionnaire or lack of reliable data for estimation. However, as review in previous sections, the results of the estimate depend on the accuracy of the assumptions, while low response rate and lack of data may lead to incorrect result of the studies. Thus, these methodological limitations of these studies open some other opportunities for future research. This direction is the more difficult and challenging for future research. It requires a careful in design questionnaire, chose sample size, a suitable data-collection technique and measurement of variables, and chose estimation framework.

Finally, this research and its findings may be importance to practitioners on dealing with the training and firm performance in the workplace because it clearly demonstrates that training has positive and significant impact on firm performance. Thus, training is a valuable path to follow when an organization would like to improve its performance. In addition, based on our review and framework for analyzing training and firm performance issues, managers could find some interesting clues and advantages of training, its usefulness in their organization. For instance, a company could be measure and calculate some types of training for their employees (workers, supervisors, managers) in order to gain a better understanding on how different types of training influence on financial and non financial performance indicators. After that, managers could decide when and how to provide training programs for their employees in order to obtain their best performance.

In conclusion, the research and its findings on the relationship between human resource training on performance not only provides guidance for future research but also can help practitioners and managers decide on their human capital investment plans, as well as policy makers in macroeconomic decisions regarding to public fund for training because research results suggest that training has positive and significant impact on firm performance. The paper was review the literature on human resource training and its effect to firm performance, developed and proposed a framework for analyzing training and firm performance issues in order to assess the advantages and disadvantages of many previous studies (e.g., research design, measurement of variables and firm performance, or estimation method, etc.), to suggest directions for future research, to improve the accuracy of the research results in the future and managerial implications on this topic.

## REFERENCES

- Ahmad, S., & Schroeder, R. G. (2003). The impact of human resource management practices on operational performance. *Journal of Operational Management*, 21, 19–43.
- Alliger, G. M., Tannenbaum, S. I., Bennett, W., Traver, H., & Shortland, A. (1997). A meta-analysis on the relations among training criteria. *Personnel Psychology*, 50, 341–358.
- Aragón-Sánchez, A., Barba-Aragon, I., & Sanz-Valle, R. (2003). Effects of training on business results. *International Journal of Human Resource Management*, 14, 956–980.
- Ballot, G., Fakhfakh, F., & Taymaz, E. (2001). Firms' human capital, R&D and performance: A study on French and Swedish firms. *Labour Economics*, 8, 443–462.
- Ballot, G., Fakhfakh, F., & Taymaz, E. (2006). Who benefits from training and R&D, the firm or the workers. *British Journal of Industrial Relations*, 44, 473–495.
- Barling, J., Weber, T., & Kelloway, E. (1996). Effects of transformational leadership training on attitudinal and financial outcomes. *Journal of Applied Psychology*, 81, 827–832.
- Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17: 99-120.
- Barrett, A., & O'Connell, P. J. (2001). Does training generally work? The returns to in-company training. *Industrial and Labor Relations Review*, 54, 647–662.
- Bartel, A. P (1994). Productivity gains from the implementation of employee training programs. *Industrial Relations*, 33, 411-425.
- Bartel, A. P. (1995). Training, wage growth and job performance: Evidence from a company data-base. *Journal of Labor Economics*, 13, 401–425.
- Bartel, AP. (2000). Measuring the employer's return on investments in training: Evidence from the literature. *Industrial Relations*, 39, 502–524.
- Becker, G.S. (1962). Investment in Human Capital: A theoretical analysis, *Journal of Political Economy* 70(5, No.2): 9-49.

- Berthal, P., & Wellins, R. (2006). Trends in leader development and succession. *Human Resource Planning*, 29(2), 31–40.
- Birley, S., & Westhead, P. (1990). Growth and performance contrast between ‘types’ of small firms. *Strategic Management Journal*, 11, 535–557.
- Bishop, J. (1991). On the job training of new hires. In *Market Failure in Training?* Edited by David Stern & Jozef M. M. Ritzen, (pp. 61-94). New York: Springer-Verlag.
- Bishop, J. (1994). The Impact of Previous Training in Schools and on Jobs on Productivity, Required OJT, and Turnover of New Hires, Private Sector and Skill Formation: International Comparisons, edited by Lisa Lynch, National Bureau of Economic Research, Chicago: Univ. of Chicago Press, 161-200.
- Black, S. E., & Lynch, L. M. (1996). Human-capital investments and productivity. *The American Economic Review*, 86, 263–267.
- Boon, M., & van der Eijken, B. (1998). Employee training and productivity in Dutch manufacturing firms. *Netherlands Official Statistics*, 13, 19–24.
- Bracker, J., & Cohen, D. J. (1992). Impact of training and development activities on technology oriented entrepreneurial performance. *Journal of Small Business Strategy*, 3, 1–14.
- Cappelli, P., & Neumark, D. (2001). Do “high-performance” work practices improve establishment-level outcomes. *Industrial and Labor Relations Review*, 54, 737–775.
- Chapman, P.G. (1993). *The economics of training*, first edition. Exeter: BPCC Whearons Ltd.
- Cho, S., Woods, R., Jang, S., & Erdem, M. (2006). Measuring the impact of human resource management practices on hospitality firms' performances. *International Journal of Hospitality Management*, 25, 262–277.
- Delaney, J. T., & Huselid, M. A. (1996). The impact of human resource management practices on perceptions of organizational performance. *Academy of Management Journal*, 39, 949–969.

- Deng, J., Menguc, B., & Benson, J. (2003). The impact of human resource management on export performance of Chinese manufacturing enterprises. *Thunderbird International Business Review*, 45, 409–429.
- Devanna, M.A., Fombrun, C.J., & Tichy, N.M. (1984): A framework for strategic human resource management. In C.J. Fombrun, N.M. Tichy & M. A. Devanna (Eds), *Strategic human resource management*, NY: Wiley, 33- 55.
- Ely, R. (2004). A field study of group diversity, participation in diversity education programs, and performance. *Journal of Organizational Behavior*, 25, 755–780.
- Faems, D., Sels, L., DeWinne, S., & Maes, J. (2005). The effect of individual HR domains on financial performance. *International Journal of Human Resource Management*, 16, 676–700.
- Fey, C., Björkman, I., & Pavlovskaya, A. (2000). The effect of HRM practices on firm performance in Russia. *International Journal of Human Resource Management*, 11, 1–18.
- Fey, C., & Björkman, I. (2001). Effect of human resource management practices on MNC subsidiary performance in Russia. *Journal of International Business Studies*, 32, 59–75.
- Fitzgerald, W. (1992). Training versus Development, *Training & Development* 46 (May): 81.
- García, M. (2005). Training and business performance: The Spanish case. *International Journal of Human Resource Management*, 16, 1691–1710.
- Ghebreorgis, F., & Karsten, L. (2007). Human resource management and performance in a developing country. *International Journal of Human Resource Management*, 18, 321–332.
- Guest, D.E. (1987): Human resource management and industrial relations. *Journal of Management Studies*, 24(5): 503-521.
- Huang, T. (2000). Are HR practices of effective firms distinctly different from those of poorly performing ones. *International Journal of Human Resource Management*, 11, 436–451.
- Huselid, M.A. (1995). The impact of human resource management practices on turnover, productivity, and corporate financial performance. *Academy of Management Journal*, 38:635–72

- Ichniowski, C., Shaw, K., & Prennushi, G. (1997). The effects of human resource management practices on productivity. *American Economic Review*, 87, 291–313.
- Kalleberg, A. L., & Moody, J. W. (1994). Human resource management and organizational performance. *American Behavioral Scientist*, 37, 948–962.
- Katou, A., & Budhwar, P. (2007). The effect of HRM policies on organizational performance in Greek manufacturing firms. *Thunderbird International Business Review*, 49(1), 1–35.
- Khatri, N. (2000). Managing human resources for competitive advantage. *International Journal of Human Resource Management*, 11, 336–365.
- Kintana, M. L., Alonso, A. U., & Olaverri, C. (2006). High performance work systems and firms' operational performance. *International Journal of Human Resource Management*, 17, 70–85.
- Koch, M. J., & McGrath, R. G. (1996). Improving labor productivity: Human resource management policies do matter. *Strategic Management Journal*, 17, 335–354.
- Kozlowski, S. W. J., & Klein, K. J. (2000). A multilevel approach to theory and research in organizations: Contextual, temporal, and emergent processes. In K. J. Klein & S. W. J. Kozlowski (Eds.), *Multilevel theory, research, and methods in organizations: Foundations, extensions, and new directions* (pp. 3–90). San Francisco, CA: Jossey-Bass.
- Kozlowski, S. W. J., & Salas, E. (1997). An organizational systems approach for the implementation and transfer of training. In J. K. Ford, S. W. J. Kozlowski, K. Kraiger, E. Salas, & M. Teachout (Eds.), *Improving training effectiveness in work organizations* (pp. 247–287). Mahwah, NJ: Erlbaum.
- Kozlowski, S., Brown, K., Weissbein, D., Cannon-Bowers, J., & Salas, E. (2000). A multilevel approach to training effectiveness. In K. Klein, & S. Kozlowski (Eds.), *Multi level theory, research, and methods in organizations* (pp. 157–210). San Francisco, CA: Jossey-Bass.
- Kraiger, K., McLinden, D., & Casper, W. J. (2004). Collaborative planning for training impact. *Human Resource Management*, 43, 337–351.

- Krueger, A. & C, Rouse. (1998). The impact of workplace education on earnings, turnover and job performance. *Journal of Labor Economics*, 16, 61–94.
- Lawler, E. E., Mohrman, S. A., & Ledford, G. E. (1998). *Strategies for high performance organizations—The CEO report* San Francisco: Jossey-Bass Publishers.
- Lyau, N. M., & Pucel, D. J. (1995). Economic return on training investment at the organization level. *Performance Improvement Quarterly*, 8(3), 68–79.
- Mabey, C., & Ramirez, M. (2005). Does management development improve organizational productivity. *International Journal of Human Resource Management*, 16, 1067–1082.
- Martell, K., & Carroll, S. J. (1995). Which executive human resource management practices for the top management team are associated with higher firm performance. *Human Resource Management*, 34, 497–512.
- Martocchio, J.J., & Baldwin, T.T. (1997). The evolution of strategic organizational training. In *Research in Personnel and Human Resource Management*, ed. RG Ferris, 15:1–46. Greenwich, CT: JAI
- Meschi, P. X., & Metais, E. (1998). A socio-economic study of companies through their training policies. *Management International Review*, 38(1), 25–48.
- Newkirk-Moore, S., & Bracker, J. S. (1998). Strategic management training and commitment to planning. *International Journal of Training and Development*, 9, 82–90.
- Ng, Y.C. and Siu, Y.M. (2004). Training and enterprise performance in transition: evidence from China. *The International Journal of Human Resource Management*, 15(4), 878 - 894.
- Ngo, H. Y., Turban, D., Lau, C. M., & Lui, S. (1998). Human resource practices of firm performance of multinational corporations: Influences of country of origin. *International Journal of Human Resource Management*, 9, 632–652.
- Paul, A., & Anantharaman, R. (2003). Impact of people management practices on organizational performance. *International Journal of Human Resource Management*, 14, 1246–1266.



Phillips, J.J. ed. (1994). Measuring return on investment, Vol 1. Alexandria, VA: American Society for training and development.

Pine, J. & Judith, C.T. (1993). ROI of soft-skills training. *Training*, 2: 55-60.

Rodríguez J.M. & Ventura J. (2003). [Human resource management systems and organizational performance: an analysis of the Spanish manufacturing industry](#), *International Journal of Human Resource Management*,14(7), 1206-1226.

Salas, E & Cannon-Bowers, J.A. (2000). The anatomy of team training. In *Training and Retraining: A Handbook for Business, Industry, Government and the Military*, ed. S Tobias, D Fletcher. Farmington Hills, MI: Macmillan. In press

Salas, E & Cannon-Bowers, J.A. (2001). The science of training: A decade of progress. *Annual Review of Psychology*, 52, 417-499.

Shaw, J. D., Delery, J. E., Jenkins, G. D., & Gupta, N. (1998). An organizational-level analysis of voluntary and involuntary turnover. *Academy of Management Journal*, 41, 511–525.

Schuler, R. S. (1989). Strategic human resource management and industrial relations. *Human Relations*, 42, 157–184.

Schuler, R. S., & Jackson, S.E. (1987). Linking competitive strategies with human resource management practices. *Academy of Management Executive*, 1: 207–219.

Storey, D. J. (2002). Education, training and development policies and practices in medium-sized companies in the UK. *Omega*, 30, 249–264.

Thang, L., & Quang, T. (2005). Antecedents and consequences of dimensions of human resource management practices in Vietnam. *International Journal of Human Resource Management*, 16, 1830–1846.

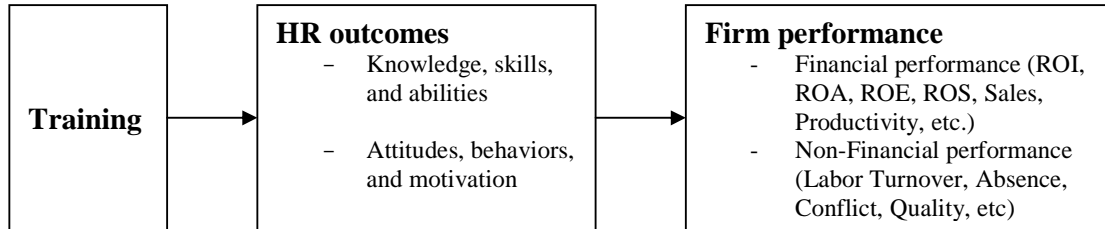
Tzafirir, S. (2005). The relationship between trust, HRM practices and firm performance. *International Journal of Human Resource Management*, 16, 1600–1622.

Vandenberg, R., Richardson, H., & Eastman, L. (1999). The impact of high involvement work practices on organization effectiveness. *Group and Organization Management*, 24, 300–399.

- Wiley, J. W. (1991). Customer satisfaction. *Human Resource Planning*, 14, 117–127.
- Wright, P. C., & Geroy, G. D. (2001). Changing the mindset. *International Journal of Human Resource Management*, 12, 586–600.
- Wright, P. M., & McMahan, G. C. (1992). Theoretical perspectives for strategic human resource management. *Journal of Management*, 18, 295–320.
- Wright, P.M., & Snell, S.A. (1991). Toward an integrative view of strategic human resource management, *Human Resource Management Review*, 1: 203-225.
- Zheng, C., Morrison, M., & O'Neill, G. (2006). An empirical study of high performance HRM practices in Chinese SMEs. *International Journal of Human Resource Management*, 17, 1772–1803.
- Zwick, T., (2006). The impact of training intensity on establishments productivity. *Labour Economics* 11(6):715–740.

**FIGURE 1**

**A framework for analyzing training and firm performance issues.**



**TABLE 1****The studies of the relationship between training and firm performance**

<i>No</i>	<i>Author/study</i>	<i>Sample size</i>	<i>Respond rate (%)</i>	<i>Firm performance</i>
<b>A. Data from a large sample of heterogeneous firms</b>				
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, $\alpha=.73$ ).
3	Ballot et al. (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 et al. (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

10	Bishop (1994)	2594	75	100 hours of formal training for new hire led to increased ROI ranged from 11% to 38% and has positive effect on turnover.
11	Black & Lynch (1996)	2945	64	10 % increase in average education will lead to an 8.5 % increase in productivity in manufacturing and a 12.7 % increase in non-manufacturing.
12	Boon & van der Eijken (1998)	173	N/A	Training raised value added per employee and gross output.
13	Bracker & Cohen (1992)	73	45	Training led to increase on sales, income, and firm present value.
14	Cappelli & Neumark (2001)	1304	72	Training has positive effects on sales per worker, productivity, labor efficiency.
15	Cho et al. (2006)	78	36	Training has positive effects on turnover, labor productivity, and ROA.
16	Delery & Huselid (1996)	590	65	Training has positive effects on firm performance ( $r=.06^*$ ) and market share ( $r=.19^{**}$ ).
17	Deng et al (2003)	97	54	Training raised export intensity and average export sale growth over three years ( $r=.17^{**}$ ).
18	Ely (2004)	486	100	Training has positive effects on new sales revenue ( $r=.16^*$ ), productivity ( $r=.21^*$ ), customer satisfaction, quality and speed ( $r=.27^*$ ).
19	Faems et al. (2005)	416	28	Training has positive effects on net profitability ( $r=.10$ ), voluntary turnover ( $r=.03$ ), and productivity ( $r=.15^{**}$ ).
20	Fey & Bjorkman (2001)	101	28	Technical and non-technical training has positive effects on overall firm performance ( $r=.44^{**}$ , non-managerial and $r=.48^{**}$ , managerial )
21	Fey et al (2000)	101	28	Technical and non-technical training has positive effects on HR outcome( $r=.23^*$ to $.51^*$ ) & overall firm performance ( $r=.22^*$ to $.26^*$ ).

22	Garcia (2005)	78	19	Training led to sales per employee, employee satisfaction ( $\alpha=.79$ ), client satisfaction ( $\alpha=.70$ ), owner/ shareholder satisfaction ( $\alpha=.71$ ).
23	Gelade & Ivery (2003)	137	49	Training has positive effects on sales ( $r=.19^{**}$ ), clerical accuracy ( $r=.18^{**}$ ), and customer satisfaction ( $r=.37^{**}$ ).
24	Ghebreorgis & 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 & Tzafir (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. (1996)	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 et al. (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 $.19^*$ ).
38	Martell & Carroll (1995)	115	26	Training has 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 et al. (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	Zeng et al. (2006)	74	22	Training has positive effects on competency, turnover, and employee commitment.
52	Zwick (2006)	2079	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.
----	---------------	---	---	--



54	Krueger & Rouse (1998)	2	2	Reading, writing, and math has positive effect on ROI (7 %) in manufacturing company, turnover, absenteeism, and job performance in both manufacturing company 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 supervisory skills.
59	Phillips (1994)/ Midwest Banking	1	1	Customer 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.
65	Phillips (1994)/ Magnavox Electronic Systems	1	1	Literacy skills 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.

