

Relationship Between Training and Employee Productivity in Organization: A Partial Least Square (PLS-SEM) Approach

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Abstract

Many manufacturing organizations focus only on technical enhancement of machines and adopting latest technical knowhow and superior raw material to produce goods and offer improvements, ignoring the need of providing training, particularly to their technical staff involved in production process in order to improve their productivity. This study attempts to find a relationship between training and employee productivity. A mixed methods approach, both qualitative and quantitative, was used to carry out this study. A questionnaire consisting of 30 statements on the impact of general training on employee productivity was given to respondents. The data was analyzed with Smart PLS software. Taking a step further, a few statements were also added in the questionnaire about strategic skills in order to add value to this study. The gap analysis method was adopted to identify the questionnaire items and was validated for its content by experts. Complementary to the questionnaires, on - site visits were made to collect data thorough interviews, documentation and observations. The study shows that both general skills and strategic skills have a positive relationship with employee productivity. The practical implication would be in the form of guidelines for training experts and HR managers ensuring a mix of general and specific (strategic) training to impact the productivity. The limitations of this research were cost, time and lack of training and learning environment in the sampled organization. This study is a contribution to the domain of training which strives to find its positive relationship with employee productivity.

Keywords : strategic training, input and output, learning environment

1. Introduction

One of the benefits of training is reducing energy waste and increasing productivity. Peter Drucker (2005) defends productivity as “the balance between all factors of production that will give the greatest output for the smallest effort.” Hilmer (1991) too reiterated productivity as the relationship between output and input; however, he is aggrieved to see that most studies on productivity focus only on inputs, and therefore talk about cost reduction and employee retrenchment as factors of productivity growth. Dunnette (1991) also argued that productivity should be studied in terms of inputs used by an organization to achieve a specific goal. According to him, the higher are the inputs or resources in terms of labor or capital, the greater will be the productivity.

However, due to rapid automation and results oriented work environment, modern organizations seem to have redefined productivity. Nowadays higher productivity is understood in term of optimum utilization of human and material resources; minimum wastage and avoidance of rework; and quantitative and qualitative production at lower cost. In the modern terms, therefore higher productivity emphasizes more on the increase of output but with the same amount of inputs; hence a need is felt to identify, train and retain such employees who can be more productive than others. A business strategy therefore needs to be framed in order to achieve a particular productivity level by gearing up the organizational resources including the human capital. Therefore, training is understood and accepted as a business strategy and linked with enhancement of productivity level in an organization. This study highlights their significance of general training and strategic training and their relationship with employee productivity.

1.1. Productivity and Training

Prior to discussing the significance of training to enhance productivity, let us first look how productivity is measured. Productivity of a manufacturing company, for instance, can be measured in terms of production units produced in a certain period of time counted as man hours.(Hilmer,1991) In the service industry, productivity is measured in terms of revenue generated through an employee in the organization. Statistically, productivity is computed by dividing average output per time period by the total input which includes costs incurred on

resources like capital, energy, material, personnel during that period. (Fig.1)

$$\text{Productivity} = \frac{\text{Outputs provided by the process}}{\text{Inputs consumed by the process}}$$

Fig.1: Productivity equation

But productivity cannot be understood only in terms of the above equation. One may assume that productivity should be higher when there is an increase in the output but with the same amount of input, or when an organization is able to produce the same output with less input. Hence, productivity is best understood as a measure of the efficiency of an employee and all organizational resources in converting inputs into useful outputs. Therefore, it is now important to know how productivity can be enhanced in above terms and whether training plays any role in improving employee productivity.

While training is seen as a motivational factor in the process of self-development, it is also important to understand from the organizational point of view whether training has any positive connection with organizational productivity. This is a dimension of this research study. The organizational growth undisputedly depends upon the productivity of its workforce. Employee productivity, often referred to as workplace productivity (Fuller, 2016) is in fact an assessment of the efficiency of a worker or group of workers or the effectiveness in which a work is performed. It is therefore often defined as a “measure of effectiveness” with which an organization can make use of its resources. (Asmild et al, 2007; Jääskeläinen, 2010) Here measure of effectiveness refers to the efforts that an organization is able to make in order to achieve its goals and resources and training is one such effort. However, since most businesses talk of competitive advantage and profitability, Fuller (2016) still measures the effectiveness through the classic view of productivity which is “measuring outputs in relation to inputs” in a given amount of time.

Whatever measure best describes the productivity in modern times, one thing is certain that learning is the key driver for productivity. Learning is also redefined as ‘*results enabled through effective training.*’ (Brakeley and Meister, 2005), it is the organizational learning that alone enhances the competitive advantage, growth and innovation of an organizations. As a result corporate learning organisations namely corporate universities and leadership institutes are increasing in number. Organizations conduct comprehensive and continuous training program to ensure high level of productivity, particularly training their employees in latest concepts such as Six Sigma, Cloud computing, SAP modules and like and ensure a competitive advantage. But the question still remains to be resolved whether there is any relationship between such organized learning and employee productivity.

1.2. Literature Review

Becker(1993) in his human-capital theory equate productivity as a resource embodied in people. It is an intangible form of human capital that can raise earnings for the organization. Any expenditure on training with regard to improving employees’ productivity is therefore seen as an investment in human capital because knowledge and productive skills acquired through education and training cannot be separated from employees and the same become integral part of the individual employee contributing to his productivity. Kim (2014) conducted a research study amalgamating tenets of economics, strategy and psychology to assess the organizational utilization of their human resources for employee productivity and organizational performance. The findings of the study show that internal training of selected staff has a direct influence on the labor productivity of the staff, particularly when the organization is passing through a slack economy and must resist the pressures of recession. The study reveals that internal training was found to be more beneficial during post-recession period as staff trained were found to be more flexible and adaptive to changes leading to the firm’s profitability. Hence the study lays evidence of linkages of productivity with training provided it is amalgamated with the business strategy.

Ilmakunnas and Piekkola (2014) in their study on Finnish firms examine ROI on strategic inputs like R&D and IT in order to measure and compare the productivity output from these strategic activities with what is gained from labor inputs of the trained human capital. The results show that trained staff contributed to a large share in the profitability but the returns from R&D were found to be low. The study draws the conclusion that investments in employees’ training result in higher organizational competence and faster productivity growth. The authors seem to reiterate what Becker (1993) postulated in his human capital theory that expenditure on training is unequivocally termed as investment in human capital.

Looking at productivity in term of return-on-investments (ROI), there are a few studies that provide the impact of training on productivity in tangible terms. Dearden et al. (2006) gathered longitudinal dataset for manufacturing industries to determine the impact of training. The study concluded that the impact of training provided to employees was shown as value-added per worker to his productivity and thus concluding that training and productivity had significant and positive relationship. A result of this study was that on-the-job training was directly associated with productivity. With regard to British industries, the research revealed that a

1 % increase in work-training gives rise to about 0.6 % the value added per hour and about 0.3 % the hourly wage which means that with every increase of 5 percentage points of trained workers, there will be 4 percent increase in productivity. Similarly, Sala and Silva (2012) in their study on labor productivity linked vocational training with employee productivity. Their estimate was that each training hour provided to each employee increased his productivity growth by around 0.55 % points. Likewise, Holzer et al (1993) conducted a research on calculating the scrappage rate of a few manufacturing firms in Michigan, USA in order to determine the impact of training on reducing this percentage. This was an issue of quality assurance where rework or recycling of faulty discarded units resulted in huge costs to the firm. The type of training was strategic as the issue was related to quality and business growth and the productivity would be measured by the amount of reduction of the scrappage rate. The research was generated based on data of training inputs and production outputs provided by the company. The study results revealed a reduction of scrappage rate by approximately 7 percent when strategic training was given full attention. This study is another example of a positive relationship between strategic training and productivity.

The current study is therefore carried out to verify all such findings of prior studies. To differentiate this study from previous researches, this study combines general training and specific training to study their relationship with employee productivity. General training, according to Becker (1993), is a kind of investment in human capital with the aim to improve the worker's productivity to the extent that it meets the organizational objectives; while strategic training increases productivity only for the organization that provides him training. General training is given in the fields of languages, computer skills, soft skills, and other analytical skills like time management, stress management and decision making skills and therefore general skills have a productive value in many organizations, but strategic skills such as cLEAN, Lead Auditors, Six Sigma and Cloud Computing are only valuable in a particular organization where the worker is currently employed. Black and Lynch (1996) however felt the need of expanding the variables of general training and align it with the strategic training. It was a response to such business activities like corporate restructuring, mergers and acquisitions, spinoffs and new business ventures. According to them, employee productivity will also expand and get new dimension as employees now will be trained in business oriented skills of strategic importance such as negotiation skills, creativity and innovations, quality benchmarking and like. They also felt that these new skills would have great impact on productivity growth.

1.3. Research Design

This study adopted a mixed method approach using both the quantitative and qualitative methods of research (Creswell, 2009) the study commenced with the quantitative approach as phase I of the study and moved to the qualitative approach as Phase II. The rationale for using the mixed method approach was to complement each method to execute a complete study of the given variables and hypotheses (Teddlie and Tashakkori, 2009). In Phase I, the quantitative phase, the researcher conducted a web based survey in the sampled organizations. The study in this phase focused only on the quantitative or numeric data in order to identify any potential predictive power of the independent variables, general training and specific training, in terms of the dependent variable, employee productivity. In Phase II, a methodological triangulation was the main objective so data was collected interviews and documentation. Such data was useful in identifying not only the significant predictors of the alignment between general training and specific training but also their individual relationship with the employee productivity.

An important feature of this study was that the constructs for the qualitative phase emerged from the inferences of the quantitative phase (Teddlie and Tashakkori, 2009). Unlike the quantitative phase, which was only exploratory, the qualitative phase was confirmatory and analytical. That is, inferences took a qualitative approach. The findings of the quantitative phase had provided only a statistical analysis of the research hypotheses but the findings of the qualitative data helped to understand employees' viewpoints about training and its relationship with productivity

A grounded approach was used to analyze the data collected in the qualitative phase. (Punch, 2005; Orme, 2013), using subjective parameters, the researchers made a close examination of participants' perceptions and was able to track constructs as being narrated by the participants or found in the documentations and the same were listed in different categories in order to establish the relationship between general training and strategic training. The grounded theory proved helpful since such factors could be identified that had affected the participants in relation to their understanding of general training and the strategic training and their relationship with employee productivity.

Research Instruments

For the quantitative phase, a web-based questionnaire carrying 30 statements was distributed among the employees of 5 different organizations belonging to different sectors like Manufacturing, Retail, Pharmaceuticals and IT. The survey comprised of several dimensions including personal, demographic, professional status, individual exposure to general as well as strategic training and how they looked at the results of training, its

business value in terms of employee productivity.

For the qualitative phase, semi structured interviews and documentation were used as instruments of the study since their primary objective was to undertake a methodological triangulation and confirm the findings of the quantitative phase. Triangulation also enabled the researchers to look with different perspectives at the research questions and to add credibility and confidence in the conclusions drawn from the study (Patton,2002; Oleinik, 2011)

Research Questions

1. Does general skills training influence employee productivity?
2. To what extent is strategic skills training related to employee training ?

Research Objectives

1. To investigate the impact of general skills training on employee productivity
2. To know the influence of strategic skills training on employee productivity

Research Hypotheses

The empirical evidence from the preio studies showed a positive relationship between training and employee productivity and hence the relevant hypotheses were stated thus:

1. *Ho1: General skills training is positively related to employee productivity*
2. *Ho2: Strategic Skills training is positively related to employee productivity*

1.4. Analysis

Assessment of PLS Path Model Results

In analysing data collected in this study, we adopt a two-step method to evaluate and report the results of PLS-SEM path, as recommended by Henseler, Ringle and Sinkovics (2009). The adopted process comprises of the following:

1. the assessment of a measurement model, and
2. the assessment of a structural model,

Measurement Model Assessment

Measurement model encompasses knowing the individual item reliability, internal consistency reliability, content validity, convergent validity and discriminant validity as suggested by scholars (Hair et al., 2014; Henseler et al., 2009). The figure shows the measurement model

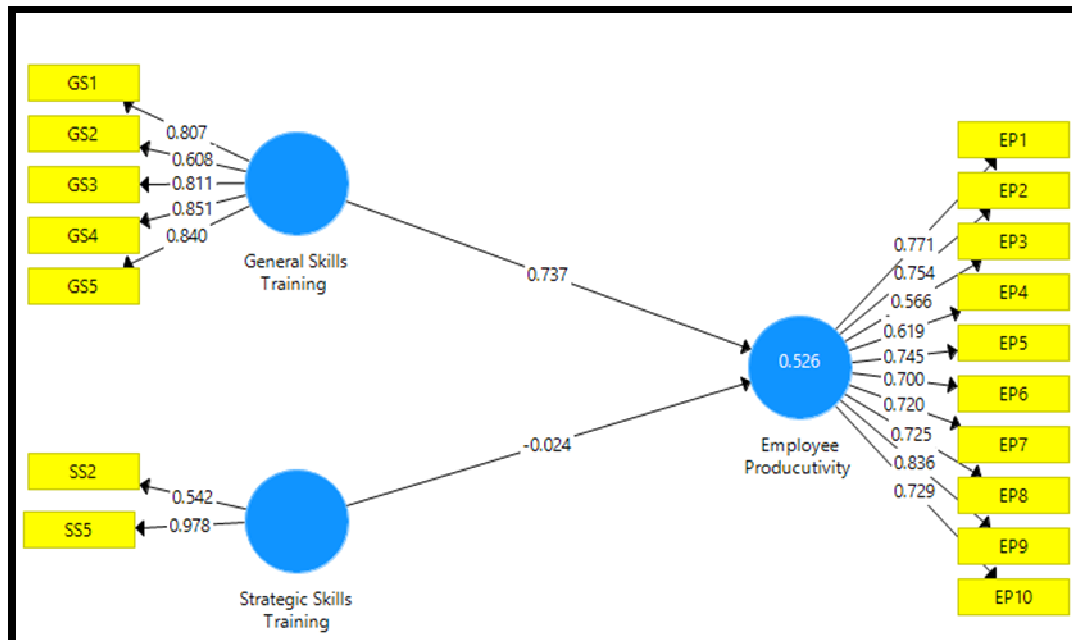


Figure 1: Measurement Model

Individual Item Reliability

Individual item reliability was determined by examining the outer loadings of each construct’s measure as recommended by (Hair et al., 2014). In consonance with the rule of thumb for retaining items with loadings that are normal for a model, with the benchmark (between .40 and .70) (Hair et al., 2014), it was revealed that all the retained items in this study is more than the minimum requirement of loadings of 0.40. Thus, the loadings are between 0.542 and 0.978.

Internal Consistency Reliability

Internal consistency reliability can be defined as the extent to which items on a particular construct are measured (Sun et al., 2007). Meanwhile, research has shown that Cronbach’s alpha coefficient and composite reliability coefficient seems to be the most conventional estimator of the internal consistency reliability of an adapted instrument in research (e.g., McCrae, Kurtz, Yamagata, & Terracciano, 2011). In this present study, we chose composite reliability coefficient to determine the internal consistency reliability of measures that were adapted. We have two main valid reasons for the use of composite reliability in this study. Firstly, we chose composite reliability coefficient because it provides a much less biased estimate of reliability than Cronbach’s alpha simply because the later accepts that all items have equal contribution to its construct without taking into consideration, the actual contribution of individual item loadings (Gotz, Liehr-Gobbers, & Krafft, 2010). The table below explains the Cronbach’s Alpha, Composite Reliability and Average Variance Extracted.

Table 1

Composite Reliability and Average Variance Extracted

Constructs	Cronbach’s Alpha	Composite Reliability	Average Variance Extracted (AVE)
Employee Productivity	0.907	0.914	0.519
General Skills Training	0.844	0.890	0.622
Strategic Skills Training	0.724	0.755	0.625

Convergent Validity

According to Hair et al., (2014), convergent validity means the extent to which items truly represent the intended latent variable or construct and undeniably correlate with other measures of the same latent construct. However, in determining the convergent validity in this study, we assessed it by examining the Average Variance Extracted (AVE) of each construct, as prescribed by Fornell and Larcker (1981). In order to achieve convergent validity, Chin (2010) suggests that the Average Variance Extracted of each construct should be in the region of at least .50 or more. In line with this suggestion, Chin (2010), the AVE values in this study had high loadings of AVE as displayed above (> .50) on their respective constructs, which shows adequate convergent validity.

Discriminant Validity

Duarte and Raposo (2010) describes discriminant validity as the extent to which a particular latent construct is different from other constructs. In this study, we ascertained discriminant validity by using AVE, as recommended by Fornell and Larcker (1981). Thus, this was achieved by matching the correlations among the constructs with square roots of AVE (Fornell&Larcker, 1981). The table below shows the discriminant validity of the latent constructs.

Table 2

Discriminant Validity

Constructs	Employee Productivity	General Skills Training	Strategic Skills Training
Employee Productivity	0.720		
General Skills Training	0.725	0.788	
Strategic Skills Training	0.336	0.489	0.791

Furthermore, as said earlier that discriminant validity can be best ascertained by comparing the indicator loadings with cross-loadings as suggested by (Chin, 2010), and that all the indicator loadings should be more than the cross-loadings. The Table below compares the indicator loadings with other indicators. Therefore, all indicator loadings were more than the cross loadings, indicating adequate discriminant validity for advance analysis.

Table 3
Cross Loadings

Constructs	Employee Productivity	General Skills Training	Strategic Skills Training
EP1	0.771	0.434	0.291
EP2	0.754	0.344	0.207
EP3	0.566	0.154	0.102
EP4	0.619	0.285	0.256
EP5	0.745	0.760	0.163
EP6	0.700	0.374	0.367
EP7	0.720	0.381	0.410
EP8	0.725	0.798	0.225
EP9	0.836	0.592	0.249
EP10	0.729	0.280	0.214
GS1	0.706	0.807	0.204
GS2	0.460	0.608	0.210
GS3	0.577	0.811	0.385
GS4	0.569	0.851	0.592
GS5	0.482	0.840	0.579
SS2	0.087	0.315	0.542
SS5	0.352	0.446	0.978

Assessment of Significance of Structural Model

Having established the measurement model, next, we assessed the structural model of the study. In assessing the structural model, we also applied adequate bootstrapping procedure to assess the significance of the path coefficients as suggested by (Hair et al., 2014; Henseler et al., 2009). Figure 2 and Table 4 therefore show the estimates for the structural model.

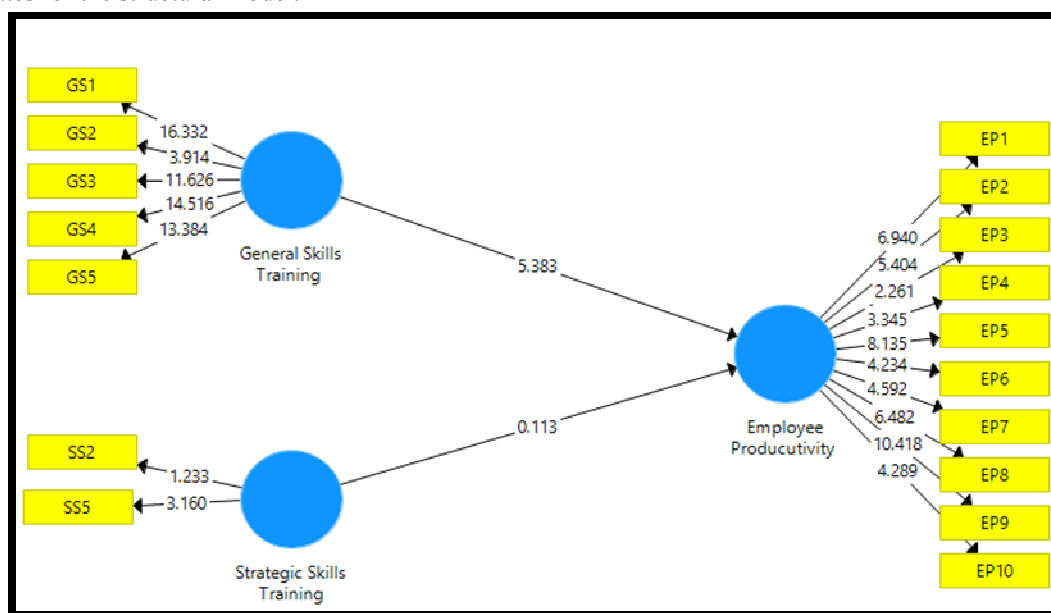


Figure 2: Structural Model

Table 4
Table of Significance

		Original Sample	Sample Mean	Standard Deviation	T Statistics	P Values	Decision
General Training	Skills	0.737	0.707	0.137	5.383	0.000	Supported
Strategic Training	Skills	-0.024	0.065	0.217	0.113	0.910	Not Supported

1.5. Discussion

At the outset, the authors of this study postulated that hypothesis 1 predicted that general skill training was

positively related to employee training. Result in Table 4 revealed a significant positive relationship between general skills training and employee productivity ($\beta = -0.737$, $t = 5.383$, $p < 0.000$), supporting Hypothesis 1. This indicated that when employees have general skills, it would positively translate to high productivity on the part of the employee in the organization. Thus, this finding is in congruent with a few studies that on this subject. For instance, Black and Lynch (1996) based their studies that had experienced some form of corporate restructuring and had introduced strategic training distinct form of general training. They found that the impact of general training on employee productivity remained significant but equally was the strategic training. These findings are also in line with Barrett and O'Connell (2001) but they argued that employees should devote more time to general training as compared to strategic training. They rationalized their recommendation by stating that general training has a feature of transferability and that it enhanced employability. The study by Dearden et al. (2006) also discovered a significant relationship between training and productivity and measured the impact as value-added per worker. In another study deeply affected by the economic recession, Rousseau (1995) argues that though general training has a positive relationship with employee productivity but it should be introduced only in short term and transitional employments rather than long-term and relational contracts. It is more beneficial to the employer who enjoyed the benefits of a productive workforce with no extra costs associated with employees since they were on short term employments.

The hypothesis 2 predicted that strategic training was positively related to employee productivity. Result in Table 4 shows that strategic training skills had a positive significant relationship with employee productivity in the organisation ($\beta = -0.024$, $t = 0.113$, $p < 0.910$), supporting Hypothesis 2. This means that employee with strategic skills have tendency to be highly productive in the organization. The more the strategic skills acquired by the employee, the high productive he/she becomes in the organization. This finding is similar to the earlier finding by Black and Lynch (1996) who suggested that the strategic training was equally significant in terms of employee productivity as general training is; it also resonates the findings of Holzer et al (1993) who found positive linkages between strategic training and productivity. Similarly, the findings are also in consistent with Ilyas, Hin and Adnan (2016) whose study revealed that strategic training is an important predictor of profitability in an organization.

Overall, studies have the evidence that general training has stronger effects on productivity in comparison to strategic training, although the empirical evidence is not conclusive about a particular type of training.

1.6. Conclusion

A relationship between training and productivity growth is still a void to be empirically fulfilled. This research gap has motivated many researchers to search a connection between learning and economic growth. A few of these Studies have also argued that an assessment of the impact of training on productivity is incomplete without evaluating the impact of other factors like work capital, cost of goods, work environment, employee motivation and such other factors that too affect productivity levels in an organization. This paper has attempted to study the impact of strategic training on productivity provided it is offered in combination with general training. Although a key outcome of any training programmes is reflected through increased productivity, often (as quantified by sales per employee), the higher is the employee productivity, the greater is the revenue and net income growth. This study concluded with a recommendation to align general training with strategic training to provide organizations a holistic learning experience.

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