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RESEARCH PAPER

Human Capital and Labour Productivity: An Analytical Study

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ABSTRACT

Any business tends to improve its human resources in an attempt to get the most of its employees. The major interests of an entrepreneur include long-term survival and sustainability besides the attainment of the corporate goals. This paper aims to review how human capital contributes to labor productivity with particular respect to Pakistan. The age of employees, training, working time, wages and education you want to define are using to determine the human capital, which is one of the independent variables of our research, whereas the productivity of labour is the dependent one. To analyse this relationship, a cross-sectional study is conducted and 40 businesses in Multan are surveyed to obtain information. The paper applies Generalized Method Moments (GMM) approach in the study of influence of human capital on labor productivity. The results of the study showed that the coefficient in the labour productivity and employee education shows that the relationship between the two is good. The coefficient of Employee Wage is 0.006543 implying that the wages has a positive and significantly influence on labor productivity. The coefficient of training employees informs us that when there is an increase in one percent in the investment in training, results in a 0.10 percent increase in labor productivity. There is a negative relationship far as the variable of age among the employees and productivity of labour is concerned. Based on findings of the study the study recommends that both the government and business need to invest more in human capital to enable workers to exploit their talents and become more productive.

KEYWORDS Human Capital, Labor Productivity, Human Resources

Introduction

Creating the human capital would guarantee efficiency and effectiveness in the labour force and eventually this will help in enhancing the overall economy performance. Emphasis placed by literature in Development Economics is emphasized on the enhancement of both human and physical resources so as to accelerate the growth and development in the attributes of well-being of the people of particular economy (Binns & Lynch, 2018).

Paul Krugman, a Nobel Laureate defines the importance of labor productivity (LP) as the following:

"Productiveness is not the only thing that matters but, in the long-term it is almost everything."

Globalization relates to LP in various aspects among them being exposed to new technology, liberation of trade, open economy and FDI. The country ensures high productivity in labor where it has the advantage of being able to withstand the trade barriers of the global arena unlike other inefficient countries (Baily et al., 1992). The size of a labour force composes most of the factors that determine the ability of a nation to

develop over time in terms of improvement of its national output growth (Ahire & Golhar, 1996). Low unit costs and, consequently, capability of the company to compete with prices in the global marketplace, are the examples of LP ardency.

Literature review reveals that appropriate utilization of HC will influence favorably the productivity and firm performance of labor. There are also positive impacts that education has on labor growth (Albert & Barabias, 2002). He claims that human capital is the primary contributor that enhances the resources of a firm, and makes the employees more productively successful (Schultz 1961). The performance of firm is very much associated with the wage and the share of workers in profit that substantially enhances the idea of the workers towards work (see Alvarez & Lopez, 2005). According to recent literature, investment in human capital has become the most significant role in enhancing the labor productivity and sustainable economic growth (Schwarzer, 2017). Skilled employees apply new methods of higher production. Training also constitutes a major component of HC since it is influential in the upsurge of wages and productivity.

Development of skills and knowledge are the important aspects of augmenting the productivity of labor (Benavente, 2006). In the continuity that has occurred in the improvement of the economy in the 21st century, is because of an improvement in human capital (Barrett & OConnell, 2001). A more careful evaluation of the patterns of labor productivity in Pakistan is surprising as well as extremely worrying. Pakistan has started decently in the early 90s but has then entered the era of productivity decline. Rapid globalization that has been taking place since the 1980s and until only recently allowed several developing countries, such as India and China to take advantage of their advances and achieve remarkably high levels of economic growth, soaring to double digit levels. Showed contrasting figures when compared to1980s when; labor productivity was notching up at 4.2 percent per annum, taking it down to 1.8 percent in the 1990s and as low as 1.3 percent during 2000 to 15.

Although the slow and falling economic growth in Pakistan during 1990-2015 (with only fleeting rise in 2003-06) has been subject of massive cogitation, a fundamental factor which can yield this result, i.e., labor productivity, has not received the attention that it deserves. There was the growth rate of the economy of Pakistan averaging 5 percent per year since independence but the 5 decades marked the rapid fluctuation in growth. Pakistan has a hopeful lower capital to output ratio as compared to other emerging countries in the world, which reflects in its economic growth of 5 percent and 17 percent to 18 percent ratio of annual investment and size of the economy. Necessity of productivity think is, therefore, very evident to self. At the macro level in Pakistan however there has been the general occurrence of couples of productivity growth evaluations and only a few attempts to study the causes of labor productivity.

Irrespective of the indicator form, economic literatures largely shared the view that it is productivity increase that eventually dictates economic growth and by extension the economic growth that in its turn determines the country growth in the long-term period. Certainly, in the long term, increasingly productive workers have a greater anticipation of daily amenities due to the fact that an increase in productivity grants room to larger remuneration and relaxation. It is generally viewed that productivity has been the fountainhead of the extraordinary rise in human welfare during the previous century, when the eagerness of looking forward to everyday comforts increased by six-fold in the US, Germany and Italy amongst others.

Literature Review

Most of the available reports on labour productivity have dwelt on industrialized countries (e.g., Crespi et al., 2001; Fallahi et al., 2006; Masso & Vahter, 2008); alternatively, there is nothing that has been done, concerning developing countries. Several studies

examinations were conducted which control the factors of labour productivity in different countries and different type of business. Before imagining the methodology of research of this analysis, it was necessary to draw a line between any past considerable research work. The literature that has been associated with the benchmarking of productivity and performance has been actually constrained (BFC, 2006).

Yoram (1967) researched the major component of productivity which is adequate training in the place of work. He also demonstrates some of the implications of variations in human capital investment i.e. 1) those who are better educated invest more in employee training at work, 2) those who are more involved in the training concerns at a particular period of time are more involved with training later, 3) those who are more educated and more knowledgeable are more occupied in training in a workplace than the people of equal education levels'. It was worked out by Crespi and Zuniga (2012) and they take note of the importance of the human capital. Demirbag et al. (2015) postulates that human capitals influence labor productivity.

In a less industrialized nation, the economic development impedance were two; lack of education and storage of skilled worker was studied using the two researchers (Sabir and Ahmed 2008). Chaudhry (2009) argues that educated individuals can take a superior advantage of technology and enjoy more productivity. The model on labour productivity growth is worked on by Crespi and Zuniga (2012). The human capital in this model is measured using two key variables and they are education and health. They argue that labour efficiency is also influenced by a set of human capital, namely, formal education, on-the-job training and physical and mental health.

Basu, Fernald and Shapiro (2001) give an idea according to which education mismatch with job qualification has a negative impact on labor productivity. Bosworth and Wagner (2008) quantify the human capital in terms of person knowledge, skill of a worker, experience of a worker, the attitude and behavior of a worker, health condition of a worker and wages of all workers. To them the human capital concept is multidimensional. Labor skill is of interest to Collins and Virmani (2008) as all these variables have positive impact on labor productivity. On prevailing wage, he claims that employers would tend to recruit individuals who are more educated. As long as a worker is not employed on basis of his capabilities, then he is not a productive worker. This affects negatively the productivity of the worker.

Demirbag et al. (2006) hold that experienced workers are much older and skilled. The knowledge and experiences will help the firm to expand its production. With age comes better performance based on own experience that older workers perform better compared to newly workers. Eliasson, Fernald, and Shapiro (2012) reveal that new technology helps workers to obtain more production. In case worker embraces new methods of production, there are beneficial impacts to labor productivity. Fening, Collins and Virmani (2008), consider firm level analysis under context of education contribution to labour productivity. They claimed the existence of positive and significant correlation between labor productivity and education.

Chaudhry (2009) determined the impact of schooling on productivity of workers on productivity. To him, better-educated workers have high marginal output than less educated people. Di Matteo and Ahmed (2005) based an argument that the number of years extra schooling was applied by the workers did not bear much influence on the productivity. The author of the article by Granovetter (2018) examines how training influences the productivity of labor. Consequently, the two variables have a high positive correlation and blue-collar workers yielded more as compared to white-collar workers.

The factor of the influence of innovation concerning the labor productivity was also investigated by Lerner and Almor (2002) and Brotherton (2010). Their results imply

that innovation have desirable effects on labor productivity. Bosworh and Wagner (2008) research the correlation between the factors of productivity and growth in 1997-2004. Their results are that there is a substantially positive relationship between technology and labour productivity. One of the major determinants of the living standard is the productivity of labor since a high rate of per capita income reflects considerably on the output per worker.

Harash, Suhail and Jabbar (2014) suggest that average working hours of labourers and training have a positive influence on the productivity of the labour and the size of businesses has a negative influence on the productivity. Works such as that of Lobby and Rosenberg (2002) explored the issue of interrelationship of labour productivity and innovation in Italy. They find that the process innovation through capital investment has positive effect on labor productivity. They also discover that product innovation with labor productivity has a positive relation. Ngoc and Phuoc (2017) examined factors of labor productivity among 1,943 SMEs. As per their findings, major influence of productivity differs depending on industry but remain consistent in that, labour cost is that one factor that affects positively labour productivity the most.

Further, Hasan (2010) study knowledge spillover, R&D and labor productivity in India companies in the thirteen years duration between 1994 and 2006. They use the results based on panal data and GMM estimator, which indicates that labour productivity and R&D have positive association. The work by Kofi and Harrison (1999) has established that; the effect of training has led to a positive elasticity of productivity of 0.04, even though; the level of training expenditure is very low.

A study by Love and Ganotakis (2013) under a longitudinal data analysis of over 13000 companies in Belgium established that on-the-job training increase the productivity of a firm by 1-2 percentages compared to firms that have no training departments. Choudhry (2009) and Lemonakis and Voulgaris (2013) concludes that export status has significant influence on the productivity of the labor.

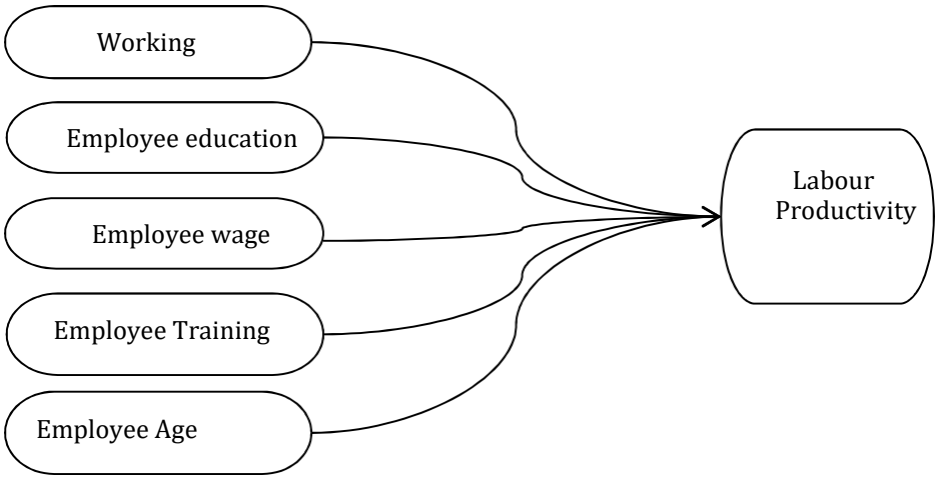

Figure 1 Theoretical Framework

Hypotheses

H1: Education of workers and labour productivity are significantly correlated.

H2: Employee wages and labour productivity are significantly correlated.

H3: Working hours and worker productivity are significantly correlated.

H4: Employee age and labour productivity are significantly correlated.

Material and Methods

Research Design

The current study intends to find out how human capital influences labour productivity. The study makes use of a quantitative research method. This is researched with the help of quantitative approach and empirical evidences which were presented to discover these issues. The advantage of conforming to this technique and employing it is that the variables will be analyzed in a real state of their existence and the researcher also finds it convenient to create an empirical conjunction between under-researched variables (Kolb, 2020).

Population and Sample

The study population is made up of all the small and medium enterprises in Multan. It was also impractical where the researcher might have had a big sample to gather information thus the researcher resorted to convenience sampling technique in this research. Therefore, on that basis a sample of 40 firms is taken. Data is gathered through the survey of the employees of these firms. The research is of a cross-sectional type.

Data Analysis Tools

Checking was being done on outliers. The analysis of the missing values was done. Various tests that were relevant in the current study like correlation and regression analysis were conducted on the data obtained to determine the outcomes as intended to answer the purpose of study of current study. Simultaneously, to avoid multi-collinearity and obtain correlation of the explanatory variables Pearson correlation test is used. Additionally, this study uses regression analysis so as to establish the correlation between independent and dependent variables.

Empirical Model

The statistical analysis is carried out with the help of STATA 12 software. The hypothesis is tested using attribute-able generalized Method of Movement (GMM). In this section, the econometric model with the view of testing out of the hypothesis which has been contained in the earlier chapter is being represented. In an attempt to analyze the effects of HC on LP the model is as follows:

$$LPit = \alpha + \beta 1\ (ED)it + \beta 2\ (WH)it + \beta 3(EW)it + \beta 4\ (ET)it + \beta 6\ (EA)it + \varepsilon it$$

Where,

LP = Labor Productivity
ED = Employee Education
WH = Working Hour
EW = Employee Wage
ET= Employee Training
EA= Employee Age

Results and Discussion

Table 1 shows the mean, standard deviation, minimum and greatest value of the manufacturing sector data series. The hypothesis is tested by using instrumental GMM, which addresses the issue of endogeneity, Tables 2 reveals the results. Endogeneity test

indicates that education of the employee and training on the employee cannot be considered exogenous variables because the p- value is below 0.5, therefore null hypothesis of exogeneity of variables will be rejected. Table 2a; another test is being done to determine whether the employed instruments are weak or not, in case they are not, we would like to know more about the relationship between the two the endogenous regressors and the instruments. The f statistic value is much greater than all the critical values that are in our table, thus the null hypothesis could be rejected that the instruments that we are using are weak. We are therefore well equipped in this case.

Regression Analysis

Using the generalised method moments (GMM), the researcher in this study measures the possible effect of human capital on the productivity of labour. The endogeneity problem was checked using GMM technique. The lack of variables or measuring errors is the source of endogeneity problem.

The labour productivity is directly related with employee education since its coefficient is 0.141032. In particular, the outcome indicates that every percent rise in employee education is followed by rise in labour productivity of 25 percent. Therefore education is greater factor to raise production of labor in Pakistan. The coefficient of the education of the employees is significant at the level of 0.0004.

Age of the employees is negatively correlated to labour productivity as it is reflected by the coefficient of -0.176. The coefficient of Employee Training is 0.104787 and this implies that an increase of one percent of the investment on training will lead to an increase of 0.10 percent of labor productivity. The coefficient is significant since P-value of 0.0045 is less than the level of confidence.

The coefficient of the employee wages (that is 0.006543) shows that salaries have a significant and positive effect on labour productivity. Labour productivity is very sensitive to wages. The value of P is significant at 0.0178. Such association is however not statistically significant since it has a p-value. The findings also indicate the positive relation between the labour productivity and the variable hours in working. The fact that the positive indicator shows increasing labour productivity as the working hours increase shows that it is positively correlated. It is strange in our analysis. The results reveal that, every 1 percent increment in working hours will stimulate an increment in the labour productivity by 4.9 percent. The significant P-value is, 0.0001.

Lerner and Almor (2002) examined influence of employee education to labour productivity. Their data indicate that labor productivity could be positively affected by education of the employees. Brotherton (2010) in a research that was the result of using panel data, analyzed the effects of the education of employees on labour productivity in the 5 countries, referred to as BRICS that have managed to gain the attention of recent years, due to their economic performances. The results proved that there exists a positive relationship amid employee labour productivity and education.

Saxena (2009) use employee training to study employee training and labor productivity of Indian firms between 1994_2006. Their result (using panal data and GMM estimator) indicates the positive correlation with Employee Training and labor productivity. Over 6 years of time Vlachy, J. (2017), examine the question whether or not Employee Training affects labor productivity. There are 372 firms which are included into the sample. In the context of his applying the panal data model, their results show that there exists a positive affiliation between the two variables. Nevertheless, their findings have a bad turn when they employ the linear model.

Table 1
Descriptive Statistics of Manufacturing Sector

Variables	Minimum	Maximum	Range	Mean	SD
LP	3.24	7.53	3.17	5.36	0.57
Ed	1.03	345.0	336.76	73.18	112.43
WH	27.0	68.0	31	37.59	4.45
EW	3	5	1	3.59	0.28
ET	1.3	375.0	364.3	110.09	134.07
EA	0	77.0	81	21.54	20.76

According to table 1, it is clear that the minimal values of Education, working hours, wage, training, and age are 1.03, 27.0, 3, 1.3, and 0 respectively. You can take the maximum values of these variables as 345, 68, 5, 375, and 77 respectively. Working hours, employee wage, and employee age do not differ much. The level of training and education among employees is becoming less steady.

Table 2
Instrumental Variables (GMM) Regression Analysis

LP	Coef.	Robust Std.Err.	t	P>|t|	[95%Conf. Interval]
Employee Education	0.141032	0.0028402	3.38	0.0004	0.1711410
Employee Wage	0.006543	0.000251	2.37	0.0178	0.0002518
Working Hour	0.037421	0.0004817	3.57	0.0001	0.0004845
Employee Training	0.104787	0.0000684	3.06	0.0045	0.0605547
Employee Age	-0.176520	0.0002311	-1.19	0.1077	-0.1197718
Con	0.115354	0.0184647	4.01	0.0000	0.0700110
Instrumented:	Employee Education Employee Training				
Instruments:	Employee Wage Working Hour Employee Age				

F = 132.53
Prob > F = 0.0000
R-squared = 0.3442
AdjR-squared = 0.3918
GMM weight matrix: Robust
Root MSE =0.0304Test of endogeneity (orthogonality conditions)
Ho: variables are exogenous
GMM C statistic chi2 (2) = 1.764 (p = 0.0122)

Table 3
First-stage regression summary statistics

Variable	R-sq.	Adjusted R-sq.	Partial R-sq.	Robust F	Prob>F
Employee Education	0.2741	0.2746	0.0186	124.7635	0.0000
Employee Training	0.5600	0.5764	0.5954	65.03602	0.0000

Minimum eigenvalue statistic = 32.164
Critical Values # of endogenous regressors: 2
Ho: Instruments are weak # of excluded instruments: 2

Conclusion

The primary factor that grows resources of any company and makes its people more productive is their HC. HC incorporates training, education and the degree of skills,

knowledge and abilities, which enhances the performance of the firm. Thus, contemporary and progressive nations invest very large amounts of money and make attempts to enhance their HC. The educational system of a developed country, hospitals, food and clean and orderly environment are some of the things that make it better than an underdeveloped nation. The human capital development will make the labour force effective and efficient and this will also enhance the performance of economy in the end. The human factor and the peculiarities of this aspect like the education level or availability of the necessary resources are of utmost importance to the process of productivity.

The research undertakes the impact of human capital on labour productivity through the generalised method moments (GMM) method. The coefficient of Employee Education (0.141032) is an indication that there is a positive relationship between labour productivity and the level of education of employees. To be precise, the outcome reveals a 25 percent increment in labour productivity with an addition of 1 percent in education of the employees. Therefore, education is more potent factor in Pakistan to enhance labor output. The coefficient of employee education proved to be significant with P-value = 0.0004. The coefficient associated with employee training is 0.104787 which implies that every 1 percent rise in expenditure on training will cause 0.10 percent rise in the labor productivity. As P-Value is less than the level of confidence, then the coefficient is significant.

The labour productivity is affected by employee wages positively and with large influence signified by the coefficient value of 0.006543. Salaries play an imperative role in the decision related to the productivity of labour. Also, the findings show that there is a positive correlation between variable working hours and labour productivity. Based on the findings, a 1 percent increment in working hours enhances an expansion of the labour output by 4.9 percent. The coefficient (-0.176520) of the variable Employee Age means that there is negative correlation between the labor productivity and Employee Age. This relationship however, cannot be considered to be statistically significant as indicated by p -value.

Recommendations

The minimum percentage of GDP that the study has recommended to the government to spend on education during any situation is 4%. Manufacturing industry requires highly skilled and technical employees and workers should be provided training facilities on the top priority so that productivity of labour can be improved. With this in mind, the government ought to be more concerned about the way in which the Technical Education and Vocational Training Authority (TEVTA) is shaping up in the province.

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