_____

Research Article   ⊖ **Open Access**

ROLE OF INFORMATION TECHNOLOGY ON EMPLOYMENT GENERATION: A CASE STUDY OF PAKISTAN

Sadia Zubair [1] Abdul Ghafoor Awan[2] Ph.D ⓘ

1. M. Phil Scholar, Department of Economics, Institute of Southern Punjab, Multan
   .Sadiazubair16@gmail.com

1. Dean, Faculty of Management and Social Sciences, Institute of Southern Punjab-Multan-Pakistan ghafoor70@yahoo.com. Cell # 0923136015051

Abstract

The objective of this research paper is to analyze the role of information technology in employment generation in Pakistan. We used time series data for the period from 1996 to 2015. Employment generation was dependent variable while independent variables include: credit to private sector, Gross fixed capital information, FDI and money supply (M2). For analyzing data, we used statistical techniques like descriptive statistics, Correlation Metrix, Ordinary Least Square (OLS), t-statistics and F-statistics. The results show that credit to private sector and FDI have positive and significant relationship with employment generation while money supply and gross fixed capital formation have negative relationship. We suggest that the Government   should encourage investment in IT sector and focus on the development of human capital to make the economy knowledgeable.

_____

_____

1. Introduction

The fundamental purpose of automation and technology is to improve productivity, increased output and reduce costs. Not only does rising productivity increase overall growth but also influences living standards, consumption and per capita income. Although our standard of living has become much better but the effect of technology is not always positive specially if we see its effect on job market. Different economies will show different results when they will go through the technological changes.

If we talk about Pakistan economy, it is undergoing an economic transformation that can place it well in the ranks of emerging market economies. Pakistan was recent upgraded from a frontier economy to an emerging market in the MSCI index. We will see how the Pakistan economy is responding to automation and technological progress as it is the need of the time to become technologically advanced. We confine our discussion to a specific technology, that is information technology and its effects on employment generation in Pakistan. Information technology (IT) is the use of computers to store, retrieve, transmit, and manipulate data or information. The rapid and widespread diffusion of computers and information technology (IT) at the workplace is one of the most notable trends of the past 20 years. Technology is always evolving, with new software constantly emerging to solve problems and inefficiencies that companies may not even be aware of yet. Business leaders can sometimes feel overwhelmed in the face of so much changes. We always talk about the benefits we gained from technology and less about negative effects of new technology and automation especially on job markets. Here we will discuss the problems, faced by the job market in

_____

Pakistan, which is a developing country where modern technology is crucial but what about the job market, is need to be examined. Information technology is increasing or decreasing number of jobs in real term is the main research problem of this study.

1.2 Main Research Problem

The study was conducted to analyze the impact of information technology on employment generation in Pakistan.

1.3 Objectives of the Study

The purpose of this research study is given below: -

- To study the importance of Information Technology.
- To determine relationship between Information technology and employment generation in Pakistan.
- To investigate whether there is a positive relationship between ICT and employment generation.
- To analyze the impact of information technology on job market in Pakistan.

2. Literature Review

The brief review of relevant studies is given below: Roper (1980) conducted a survey and found that 72 percent of grown-ups believed that PCs had made life better, and just 23 percent felt that PCs had some negative effects. In the same survey, 30 percent said that PCs reduce costs and "free laborers from drudgery and give them more opportunity to do innovative things," even in 1980, 38 percent imagined that "such a large number of individuals had lost their positions since they have been replaced by PCs." Expansion in the industries is responsible for the new labor-saving

_____

technologies (e.g., computers). Shoshana Zuboff (1988) stated that blue and white collar workers utilizing computer and improving learning by doing and their insight was often inferred, natural, experience-based, and concrete, as it was difficult to state clearly, known in "one's bones," and setting bound. On the other hand, she concluded that work with PCs and other IT requires information that is clear, formal, unique, applied, furthermore, frequently learned through proper guidance, courses, or classes. Zuboff (1988) and Hirschhorn (1984) argued that modern computers   decreases physical work and expands the amount of thinking required for operator's jobs. Laborers presently have readily available data that was before hard to gather and was confined to administrators. They can follow steps to gain quality measurements and lead their own experiments to improve processes. Enlightened managements seek to broaden the operators' role, though there are many cases in which management seeks to limit this form of operator involvement. However, both Zuboff (1988) and Vallas and Beck (1996) noticed that supervisors frequently restricted workers training and input, either to ensure their own position and grip over information or in light of the fact that they grasped a philosophy of robotization that build skill over the commitments that managers could make on the premise of their inadequate information. Kelley (1989) surveyed 1,400 foundations in twenty-one assembling industries in 1987 and found that 47 percent of metalworking plants had introduced at least one or more PC controlled machines. However, even in those foundations most laborers associated with machining undertakings chipped away at conventional and non-programmable machines. Thompson and Garbacz (2011) explored the effect of mobile broadband on economic growth. They found the positive relationship between economic

growth and mobile broadband especially in developing countries. Peterson (2012) revealed that because of shotage of labor in ICT, Microsoft South innovation center and the International youth foundation elevate the students to business development program that plan to put 10,000 graduates in employments. Muhammad and Sadiq (2015) concluded that the jobs of information and communication technology in employment chances for work in the developing World couldn't be overemphasized as millions of youth were given opportunities for work by both public and private sectors everywhere throughout the world in ICT institutions. These opportunities ranging from educational, business, security networking.

3.Research Methodology

This study was carried to measure the impact of Information Technology on employment in Pakistan. for this purpose, secondary time series data was used. The data was collected from different relevant sources.

3.2 Selected Variables

Dependent and independent variables were selected to conduct the research study. Our dependent variable is Employment generation while our independent variables include:

- Investment in IT every year
- Gross fixed Capital Formation
- Credit to Private sector.
- Money Growth (M2)

3.3 Econometric Model

The econometric model developed for this study is given in the following:

-

_____

Employment generation= Information Technology + Investment in IT+

GFCF+ Credit to Private sector+ Money Growth (M2)

$$Y=b_o+b_1x_1+b_2x_2+b_3x_3+b_4x_4+\mu$$

where:

Y= Employment generation

bo= Constant

x_1= Foreign direct Investment in Telecommunication

x2= GFCF

x3= Credit to Private Sector

x4= Money Growth

3.4 Hypothesis of the study

Following hypothesis were developed to conduct the study:

Ho: Information Technology has no positive relationship with employment generation in   Pakistan.

H_1: Information Technology has a significant positive relationship with employment generation in Pakistan

3.5 Analytical Techniques

The data used in this study was spread over 30-years period. Multiple regression analysis was used to test the hypothesis. In multiple regression analysis we analyzed the effect of one or more than one independent variables on the dependent variable. In this empirical analysis we checked the degree of dependency of dependent variable on independent variables through tests of t-statistics, coefficients, R-squared and adjusted R-squared, F-statistics, Durbin-Watson stat, standard error and probabilities and saw their significant effects.

_____

We also checked the goodness of fit of the model. We used E-view software to draw the results.

4. Empirical Analysis

4.1 Descriptive Analysis

The results of descriptive statistics are shown in Table 1.

Table 1: Results of descriptive statistics

	EMP	CREDIT	FDI	M2	GFCF
Mean	0.282259	2453610.	1599.854	4723616.	306964.0
Median	0.280700	2383622.	1807.800	2486556.	157978.4
Maximum	0.311700	6119642.	4326.500	15763268	1213658.
Minimum	0.255400	489865.0	5.300000	290457.0	26848.79
Std. Dev.	0.020126	1666174.	1437.292	4913526.	296535.7
Skewness	0.142169	0.441870	0.202844	1.079454	1.381542
Kurtosis	1.463025	2.132406	1.696325	2.874371	4.548950
arque-Bera	2.748534	1.405906	1.786476	6.040691	11.28811
Probability	0.253025	0.495121	0.409328	0.048784	0.003538
Sum	7.621000	53979429	36796.65	1.46E+08	8288029.
Sum Sq. Dev.	0.010532	5.83E+13	45447763	7.24E+14	2.29E+12
Observations	27	22	23	31	27

4.1.1 Interpretation of Results

In descriptive analysis we simply described what the data is showing.
• Results of Mean, Median are clear. Mean is showing average measures of the data. Median reduces the effects of outlier. Kurtosis measures the flatness and peakedness of the distribution. Skewness measures asymmetry of the

_____

distribution.

• Skewness of all independent variables is normal and its platykurtic as the values are less than 3.

• Results of kurtosis showing normal distribution of credit to private sector, employment rate and foreign direct investment   because their values are less than 3.

• Jarque-Bera measures the difference between skewness and kurtosis. Difference is not much of any variable.

• Probability shows normal results of Money growth (M2) and Gross fixed capital formation (total). By observing   data we can conclude that all the data is normally distributed and there is no outlier in the data.

4.2 Correlation Analysis

Correlation analysis show the strength of relationship between variables. The results of this analysis are shown in Table 2.

Table 2: Results of correlation analysis

	EMP	CREDIT	FDI	M2	GFCF
EMP	1.000000	0.909647	0.923452	0.784109	0.698007
CREDIT	0.909647	1.000000	0.950359	0.957724	0.712094
FDI	0.923452	0.950359	1.000000	0.869947	0.690147
M2	0.784109	0.957724	0.869947	1.000000	0.587925
GFCF	0.698007	0.712094	0.690147	0.587925	1.000000

_____

4.2.1 Interpretation of Results

Table 2 shows highly positive relation between variables as most of the values are close to one and all the values are positive which implies that there is positive relationship between them. It means that if one variable is increased the other variable will also be increased and if one is decrease other one will also decrease. M2 and credit to private sector has 0.9577 correlation, credit with GFCF has 0.7120 and so on. With employment all the variables have positive relationship. We can see the values in following:

Credit to employment: 0.9096

M2 to employment: 0.7841

Gross fixed capital formation (Total): 0.6980

Foreign direct Investment in telecommunication to employment: 0.9234

Now these results are shown in Figure 1

Figure 1: Results of correlation analysis
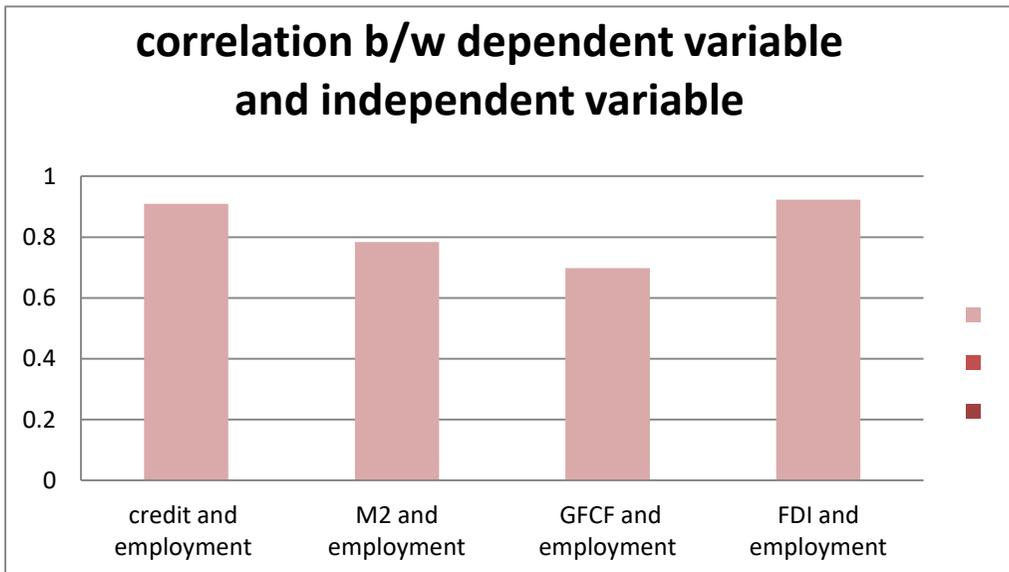
Explanation of Figure 1:

We can see in the graph that there is highly positive relationship between credit to private sector and employment as the bar is near to one. Second highest bar is Gross fixed capital formation and employment. The correlation between them is significant. The is the case of M2. Overall results show that there is positive correlation among all the variables.

4.3 Multiple Regression Analysis

Multiple regression analysis results are presented in Table 3. The results were drawn through Ordinary Least Square (OLS) Method and E-View software was used for calculation of values.

Table 3: Results of Multiple Regression Analysis

Multiple regression Analysis		
Dependent Variable: EMP		
Method: Least Squares		
Date: 03/07/21 Time: 22:30		
Sample (adjusted): 1996 2015		
Included observations: 20 after adjustments		

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.258235	0.003729	69.24523	0.0000
CREDIT	2.65E-08	7.15E-09	3.697996	0.0021
M2	-6.66E-09	1.89E-09	-3.530325	0.0030
GFCF	-7.31E-09	7.44E-09	-0.983127	0.3411
DFI	2.12E-06	3.21E-06	0.660328	0.5191

_____

R-squared	0.927342	Mean dependent var	0.287295
Adjusted R-squared	0.907966	S.D. dependent var	0.019458
S.E. of regression	0.005903	Akaike info criterion	-7.214352
Sum squared resid	0.000523	Schwarz criterion	-6.965419
Log likelihood	77.14352	Hannan-Quinn criter.	-7.165758
F-statistic	47.86158	Durbin-Watson stat	2.089665
Prob(F-statistic)	0.000000		

4.3.1 Interpretations of Results

The significance level of t-statistics, its value must be greater than 2. In probability the value must be lower or equal to the normal level. These levels are 0.01, 0.05, 0.10. Normally. the accepted value is 0.05. Now we are intended to check our results on the basis of this criteria.

4.3.1.1 Credit to Private sector

Our findings show if one unit increases in credit to private sector it will likely to bring 2.65% positive change in dependent variable that is employment. It means that 2.65 percent employment will increase if credit to private sector increases by one unit. There is a positive relationship between private sector investment and employment generation. The p-values are statistically significant as there are 0.0000 probability. Standard error is showing 7.15 deviations from the regression line. As we know if the value of t-statistics is greater than 2 the result will be significant. In credit to private sector the value is 3.69 which is significant. So, we can see overall results are positive and significant.

_____

4.3.1.2 Money Growth (M2)

Now we discuss money growth (M2) in the light of results shown in the above table. The Coefficient value is -6.66 unit which shows one unit changes in independent variable will likely to decrease unemployment by 6.7 % employment because the value of coefficient is negative. And t-statistics also show insignificant results and its value is also negative. While value of probability is 0.0030 which is a significant result as it is lower than 0.05. The value of standard error is 1.89% deviation from the mean. The result indicates that there is negative relationship between money growth and employment.

4.3.1.3 Gross Fixed Capital Formation

Ratio of total gross fixed capital formation to GDP is taken and analyzed and its coefficient value is: -7.31, showing negative relationship between independent and dependent variable It means if one unit increases in gross fixed capital formation it will likely to decrease employment by 7.31 percent. Coefficient value is insignificant as p-values is more than 0.05. Standard error shows 7.44% deviation from mean and result of t-statistics is also insignificant.

4.2.1.4 Foreign Direct Investment in ICT sector

Foreign Direct investment is investment made in ICT sector. The coefficient value of this variable in the above table is 2.12 which means if one unit increases in foreign direct investment it will likely to increase employment by 2.12 percent. The Values of t-statistics is more than 0.05 which is insignificant, probability, coefficients are also insignificant while standard error is 3.21% deviation from the mean Although two variables have

_____

positive relationship between two variables but these relationships are insignificant.

4.3.1.5 Coefficient of Determination

R^2 is also known as coefficient of determination. R-squared is the proportion of variation in the response variable that can be explained by independent variable. Its value can be between 0 to 1: by   0 means no relationship while 1 mean perfect relationship. The value of R^2 is   0.92 which reflects that 92% variation in the dependent variable (employment) level can be explained by variation in independent variables. Adjusted R-squared is a modified form of R-squared and its value is always less than R-squared. The value of Adjusted R^2-squared show that 90% variation in the dependent variable is due to change in the independent variables. Thus, the model is a goodness of fit. F-statistics indicates that independent variables jointly affect the dependent variable if the value of F-statistics is greater than probability of F-statistics and we can see in the table that value of F-statistics is greater, so the independent variables are jointly effecting the dependent variable. Moreover,

Durbin-Watson test is used to detect the presence of auto-correlation between variables. The value always lies between 0-4. If the value is less than 2 then there is positive serial correlation and if the value is more than 2 it means successive error term is negatively related and there is no autocorrelation between variables.

4.5 Graphical interpretation

In order to explain the above results we present them in graphical form.

Figure 1: Variation in the variables over the times.
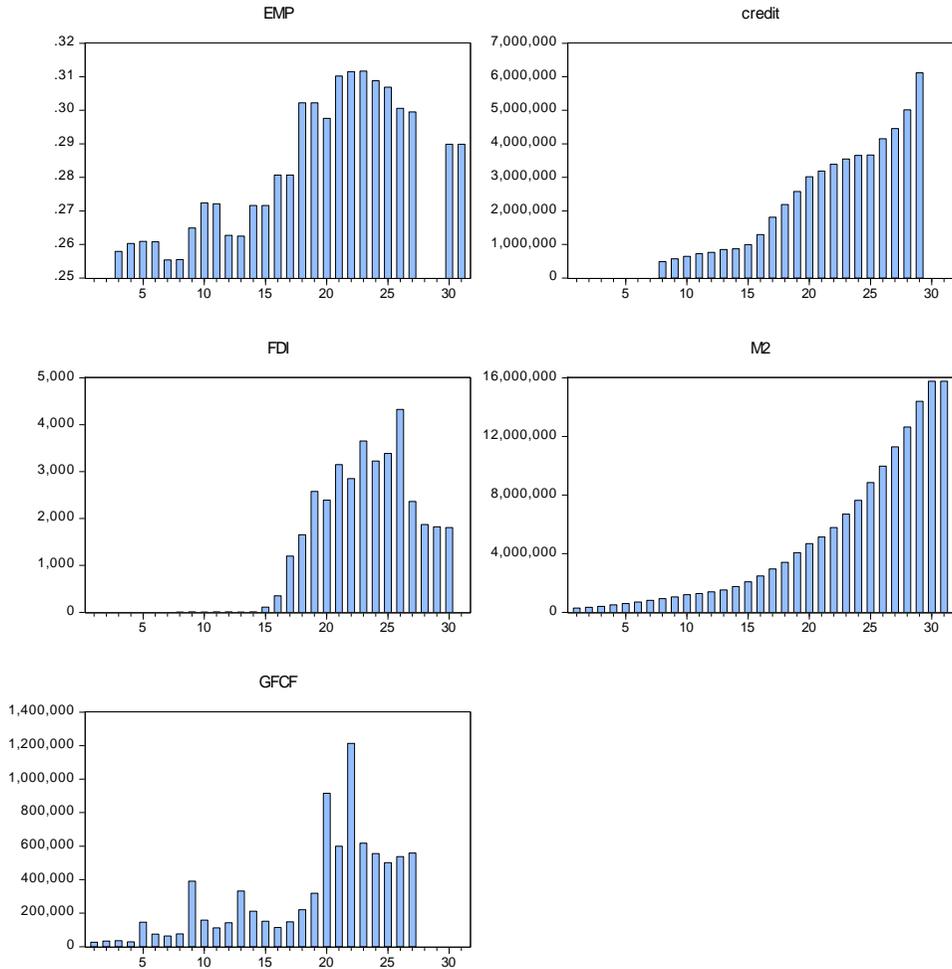
The results show in the above diagrams show that M2 and credit to private sector shows significant effect in the long run while FDI and Gross fixed capital formation have insignificant effect on employment due to fluctuations during study period. Now we show the same results in scatter diagram in figure 2.

_____

Figure 2: Scatter diagram
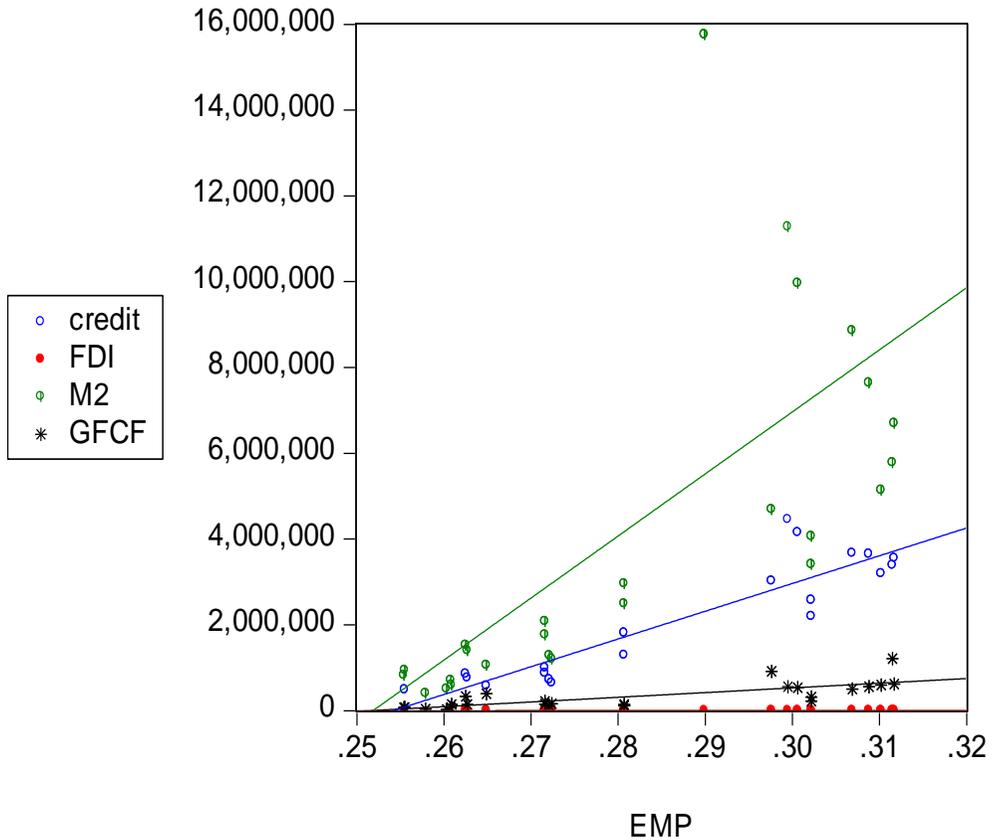
5. Findings of study

The objective of this research paper was to measure the impact of information technology on employment generation in Pakistan. The underlying idea was to explore the fact whether information technology has negative association with employment generation and create unemployment or facilitate in creation of new jobs. In other words, this research is the study of job market situation after revolution of information technology. We used

time series data from 1996 to 2015 and the data was collected from World Development Indicators, Pakistan Economic Survey, State Bank of Pakistan, and Pakistan Information Technology Board. Our dependent variable was employment generation while our independent variables were: Credit to private sector, Foreign Direct Investment (FDI), Gross fixed capital formation (GFCF) and M2. We used different statistical techniques like Descriptive statistics, Correlation Metrics and Multiple Regression Analysis. We also explain the results through diagrams. Our results show that credit to private sector has positive significant relationship with employment generation. Similarly, Foreign Direct Investment also has positive relationship with employment generation. In contrast, M2 and gross fixed capital formation have negative association with employment generation.

Being a developing country Pakistan needs more foreign direct investment which brings not only capital but also facilitate transfer of technology and this is the reason that these two variables have positive impact on employment generation in Pakistan in the long run. Whereas gross fixed capital formation and M2 have negative effect on employment generation because Pakistan is a labour intensive economy and capital formation or automation creates unemployment in the country. We found that information technology creates jobs only for skilled workers because unskilled workers could not use technology and as such play no role in economic activity. The value of adjusted R^2 0.90 indicates that the model is goodness of fit as 90 percent variation in the dependent variable is caused by independent variables. The correlation analysis also shows that all variables have strong correlation with each other's. The result of Durbin-Watson test show that there is

_____

negative autocorrelation between variables. The results of descriptive statistics are also normal as the values of all variables are normally distributed.

6. Conclusion

From the above findings we can conclude that diffusion of information technology in Pakistan has created more jobs for those workers who are well-acquainted with the technology while it has negative effect on unskilled workers. These results are consistent with theory of economic growth which states technology reduces labour demand because less and less labour is required in high tech industry while those workers who are not acquainted with technology become jobless because they do have relevant skill. This phenomenon has the same effect in all developing countries including Pakistan. As Pakistan is labour abundant country the industrialists prefer to set up labor-intensive industries to take benefit of cheap labour. But its negative effect is that Pakistan has producing primary goods since long. These goods are sold at nominal price in international market and this is the reason the size of Pakistan's GDP is small and its per capita GDP and volume of exports are very low. In order to boost economy and expand size of GDP Pakistan has to disseminate information technology and produce IT specialists in all fields through promoting skilled-based education and professional training. In this way, Pakistan will be able to utilize its surplus labour and produce surplus goods and services. Information technology is not restricted to one sector; it covers almost all major sectors of economy. Thus, if we produce more IT specialists we can absorb them into different sectors of economy and produce high tech products which will facilitate to increase national as well as per capita income.

_____

7.Policy implications

   In the light of above results we would like to make the following policy recommendations:

● Pakistan should encourage investment in information Technology (IT) sector in order expand its scope and its role in economic growth.

● Pakistan should establish more Technology Universities and Institute in order to provide IT education in remote areas.

● The Government should give fiscal incentives to private investors to invest in Technology parks on large scale.

● The Government should provide scholarship or financial assistance to those students who could not afford IT education at higher level.

● Professional training centers must be established in all urban areas to provide training facilities to the people in different disciplines of information technology.

● The Government should take policy initiative to transform the economy from imitative economy to knowledge economy.

● Pakistan is a growing economy and it needs IT specialists. For producing IT specialists at large scale a massive training program must be launched in different parts of country.

8. Limitations and future direction of research

   The sample of this study is restricted to IT industry and it may be expanded to other sectors of the economy in order to observe overall effect on national economy. This study is based on five variables and more variables can be included in the future studies in order to broaden the results. This study has also an insight for the policy makers that they should devise policies regarding

_____

the skill development of unskilled workers and for this program a crash program should be launched at national level for this purpose. The policy makers of other developing countries should also take insight from the results of this study because they are facing the same dilemma of unemployment of unskilled workers. This study has determined the effect of Information Technology on employment generation the researchers can see the effect of information technology on performance and profitability of business organizations by including relevant variables. This study may be expanded by including training and development aspects of Information Technology in their studies.

9.Theoretical contribution

Theory of economic growth states that efficiency improves growth and the countries having technology tools have higher level of productivity. This study supports this theory because the empirical results of this study show that skilled labour contributes more in productivity and national income of a country while contribution of unskilled labour is very nominal in productivity. So this study also emphasizes that the education and skill of labour must be enhanced in order to enhance productivity. The empirical results of this study also highlight the fact that information technology enhance human capital which leads to innovations and inventions in the economy and facilitate in production of goods and services at low price due to reduction in cost of production.

_____

ORCID

Abdul Ghafoor Awan ID ID https://orcid.org/0000-0001-5767 6229.

Contribution of Authors

Both authors jointly carried out this research study and collaborated each other. The author 1 collected data, conducted its statistical analysis. She prepared initial draft of manuscript. The Author 2 helped Author 1 in selected of title of research, guided in statistical analysis and formatted final draft of manuscript. Both authors carefully read final draft of manuscript and find it fit for publishing. They followed ethical values during course of this study.

Brief Note on Authors

Sadia Zubair is a research scholar at Department of Economics, Institute of Southern Punjab, Multan. She has completed her M.Phil. in Economics and is seeking further higher studies. She contributed into this research paper by way of collecting data and carrying out statistical analysis. She can be reached at her email ID: .Sadiazubair16@gmail.com

_____

Prof. Dr. Abdul Ghafoor Awan is serving as a Dean, Faculty of Management and Social Sciences since 2010.He has two Ph.Ds. His first Ph.D is in Business Administration from University of Sunderland, UK and second Ph.D is in Economics from Islamia University of Bahawalpur. He has so far supervised more than 350 research students of M.Phil levels in different disciplines. He is author of eight books on different topics. He has credit to have more than 300 research paper published in different impact factor international Journals. His research profile can be seen at Google Scholar, ORCID, Publons, and other global research databases. He can be reached at his Email ID: drabdulghafoorawan@gmail.com.

REFERENCES

Anwar, Faiqa, Awan, Abdul Ghafoor (2019) Role of Fiscal policy in employment generation in Pakistan. *Global Journal of Management, Social Sciences and Humanities*, 4 (2).   Google Scholar

_____

Awan, Abdul Ghafoor, Khan, Rana Ejaz Ali (2014). The Enigma of US productivity slowdown: A theoretical analysis. *American Journal of Trade and Policy,* Vol 1 (1):7-15.   Google Scholar/CrossRef

_____

Awan, Abdul Ghafoor, Khan, Fahad-ul Haq (2016). Impact of Management Information System on the performance of the organization (Profitability, innovation and growth). *Journal of Poverty, Investment and Development*, 21:1-16.   Google Scholar

_____

_____

Awan, Abdul Ghafoor, Farhan, Hafiz Muhammad (2016). Talent Management practices and their impact on job satisfaction of employees: A case study of banking sector in Pakistan. *Science International*, 28 (3)

Google Scholar | ISI.

_____

Berry, M. & Linoff, G. (2000). *Mastering data mining.* New York: Wiley Publishing.   Google Scholar

_____

Bhatt, G., Emdad, A., Roberts, N., & Grover, V. (2010). Building and leveraging information in dynamic environments: The role of IT infrastructure flexibility as enabler of organizational responsiveness and competitive advantage. *Information & Management*, 47(7-8), 341-349.

Google Scholar

_____

Donohue, P., & Power, N. (2012, May). Legacy job titles in IT: The search for clarity. *Proceedings of the 50th Annual Conference on Computers and People Research* (pp. 5-10). ACM.   Google Scholar

_____

David Smith and Azad Ali (2014), Analyzing Computer Programming Job Trend Using Web *Data Mining.* 14: 203-214   Google Scholar

_____

Ghazzawi, I. & Smith Y. (2009). Crafting the Whole Employee: Job Satisfaction, Job Commitment, and Faith-A New Conceptual Framework and Research Agenda. *The Business Review*, Cambridge 12 (2): 300-309.

Google Scholar

_____

_____

Giordano, Lorraine. (1992). *Beyond Taylorism: Computerization and the New Industrial Relations*. New York: St. Martin's Press.   Google Scholar

Goles, T. (2001) A View from the Entry Level: Student Perceptions of Critical Information Systems Job Attributes, *Paper presented at the SIGCPR*, San Diego. CA.   Google Scholar

Harris, A. H., Greer, T. H., Morris, S. A., & Clark, W. J. (2012). Information systems job market late 1970's- early 2010's. *Journal of Computer Information Systems*, Fall, 72-79.   Google Scholar

Huang, X. (2007). Comparison of interestingness measures for web usage mining: An empirical study. *International Journal of Information Technology & Decision Making*. 6(1), 15–41.   Google Scholar

Hunsinger, D.S., and M.A. Smith (2008). Factors That Influence Information Systems Undergraduates to Pursue IT Certification. *Journal of Information Technology Education* (7): 1–19.   Google Scholar

Hyunbae Chun (2003) Information Technology and the demand for Educated workers. *Review of Economics and Statistics*, volume:85 Issue 1, P.1-8   Google Scholar

Kiren, Kauser,. Awan, Abdul Ghafoor (2018) The Role of Globalization in employment generation: Evidence from Pakistan. *Global Journal of Management, Social Sciences and Humanities*, 4 (1)   Google Scholar

_____

Kelley, Maryellen R (1989). An Assessment of the Skill Upgrading and
    Training Opportunities for Blue-Collar Workers Under Programmable
    Automation." In Barbara S. Dennis, ed., Industrial Relations Research
    Association Proceedings of the Forty-First Annual Meetings, pp.301-08.
    Madison, WI: IRRA.   Google Scholar

Litecky, C., Aken, A., Ahmad, A., & Nelson, H. J. (2010). Mining for
    computing jobs. Software, *IEEE*, 27(1), 78-85   ISI | Google Scholar

Luzzo, D. A., & McWhirter, E. H. (2001). Sex and ethnic differences in the
    perception of education and career-related barriers and levels of copying
    efficacy. *Journal of Counseling and Development,* 79 (1), 61-67
                                                           ISI | Google Scholar

McLean, E.R., S.J. Smits, and J.R. Tanner (1996) The Importance of Salary
    on Job and Career Attitudes of Information Systems Professionals.
    Information & Management 30 (6): 291–299.   Google Scholar

Michael J. Handel (April 2004), Implications of Information Technology for
    employment, skills and wages: Findings from sectoral and case study
    research, *SRI international*.   Google Scholar

Moore, J.E., and L.A. Burke (2004) Reluctance to Report Reality in Troubled
    Technology Projects, in Igbaria, M., and C. Shayo (eds.), Strategies for
    Managing IS/IT Personnel, Hershey, PA: IGI Publishing.
                                                           Google Scholar

_____

Offer, M., & Sampson, J. P. (1999). Quality in the content and use of information and communications technology in guidance. *British Journal of Guidance and Counselling*, 27(4): 501–516.   ISI | Google Scholar

Qiang, C.Z.W.; Pitt, A. Contribution of information and Communication Technologies to Growth. In World Bank Working Paper; World Bank: Washington, DC, USA, 2004.   Google Scholar

Randall, M.H., and C.J. Zirkle (2005) "Information Technology Student-based Certification in Formal Education Settings: Who Benefits and What Is Needed," *Journal of Information Technology Education* (4), pp. 1–20.
Google Scholar

Saeed, Fauzia, Awan, Abdul Ghafoor (2020). Does Technological Advancement really affect economic growth of Pakistan. *Global Journal of Management, Social Sciences and Humanities*, 6 (2)   Google Scholar

Saleem, Ghauri (June 2013). *Role of IT Industry in Pakistan's Economy*, Daily Times.   Google Scholar

Scott-Bracey, P. (2013). Analyzing internet job advertisements to compare IT employer soft skill demand versus undergraduate IT program curriculum programs in Texas. Retrieved 10/15/2013 from http://www.editlib.org/noaccess/38669.   CrossRef | Google Scholar

_____

Thompson, H.G., Jr.; Garbacz, C. (2011) Economic impacts of mobile versus
    fixed broadband. Telecommun. Policy, 35, 999–1009   Google Scholar

_____

Timothy F. Bresnahan(May 1999). Information Technology, Workplace
    Organization, And Demand for skilled Labor: Firm level evidence.
    National bureau of economic research. Cambridge.   Google Scholar

_____

U.S. Department of Labor-Bureau of Labor Statistics. (2009-a). *Occupational
    Outlook Handbook, 2008-09*. Edition. Retrieved June 11, from
    http://www.bls.gov/oco/ocos258.htm.   Google Scholar

_____

U.S. General Accounting Office (GAO). (1998a). Information Technology:
    Assessment of the Department of Commerce's Report on workforce
    Demand and Supply. *HEHS–98–106. March 20*.   Google Scholar

_____

U.S. General Accounting Office (GAO). (1998b). Information Technology
    Workers: Employment and Starting Salaries. *HEHS–98–159R*. May 12
                                                       Google Scholar

_____

Zahra. Syeda Zuriat-ul, Awan, Abdul Ghafoor (2014). Impact of innovations
    on consumers' behaviour: A case study of Pak Electron Ltd. *European
Journal of Business and Innovation Research*, 2 (6):93-   Google Scholar

_____