



## The Impact of Digital Innovations & Investment on Firm's Performance: Evidence from Pakistan

Hanefan Shaikh<sup>1\*</sup>  | Javeed Chavara<sup>2</sup> 

### Abstract

*This study investigates that Research & Development, New Plant and Machinery, and Long-term Bonds are the significant tools for increasing Firm Performance. The study includes a quantitative base analysis with study questions which requires to cause and effect of variables; Research & Development Expenditures which is used as proxy variable for Digital Innovation, Long-term Bonds, and New Plants and Machinery which are proxy for Investment, on Net Income of firm over time period. In this case, Balanced Panel Data consist on 30 Pakistani firms from different sector, such as; Pharmaceutical, Automobile, Telecommunication, Textile and Electronics through Annual Reports of Firms since 2012 to 2021 for Fixed Effect Model, because model has different constants for each firm. Study shows significant causes and effect of innovation but investment is less degree of significant on firm's performance because Long-term bond is insignificant to effect on Net Income..*

**Keywords:** *Digital innovation, R & D, Investments, Purchase of plants and machines, Issuing long term loans and bonds, Net income*

---

### Author's Affiliation:


Institution: ILMA University, Karachi <sup>1</sup> | Mohammad Ali Jinnah University, Karachi<sup>2</sup>

Country: Pakistan

Corresponding Author's Email: \* haneefashaikh18@gmail.com

The material presented by the author(s) does not necessarily portray the view point of the editors and the management of the ILMA University, Pakistan.

2790-5896 (Online) 2709-2232 (Print) ©2022, published by the ILMA University, Pakistan.

This is open access article under the  license. <https://creativecommons.org/licenses/by/4.0/>

## INTRODUCTION

This study base on smart advancements and its significant tools to the SMEs of Pakistan for looking for new business sectors, laying out the new items, getting the consumer fulfillment, accomplishing elevated degree of production and to support up in general firm's performance. The advancement inside an association is characterized as presenting a further analysis of working together work environment arrangement strategies, basic leadership frameworks and recent examples of overseeing external or extensive scale relations. Describing the hierarchical developments applied healthier tactics for organizing business rehearses, outside ties and the workplace. The inspired implementation can be broken down by its signs.

Nowadays, manufacturing sectors are increasing their role in Pakistan after services and agriculture. According to the finance ministry the manufacturing industry plays an essential role in its economy because it contributes 18.7% of the GDP. Therefore, manufacturing is the third largest sector of Pakistan which records a growth rate of 3.56% during the fiscal year 2011-2012. (Polder et al 2010) defines organizational innovation as over viewing of new practices of doing business, a system of decision making, and organizational methods for the workplace. At the same time, corporate innovation enhances after applying new organizing methods in business practices. Organizations change the ways of organizing firms' innovation that organizations haven't implemented before OECD (2005).

As Jansen et al 2006; Roberts & Amit, 2003 explained innovation is the fuel for the best performance of the organization especially in the conditions of changing business environment, increasing demand for better quality and business competition. Researchers tested the consequences of investment variables using stepwise style in the multivariate ordinary least squares (OLS) equation. In development or extension, organizations require more capital than some of the time ready to produce inside. They investigate choices of raising that extra capital either through outer value or straight obligation. In issuing value, the organization pitches a bit of itself to people in general (in an IPO) or private speculators (in a Private Equity Placement). The purchasers are then known as shareholders and claim a piece of the organization. Manufacturing has dependably been firmly connected to innovation, which is developing rapidly.

It affects all organizations' inside and external conditions paying little respect to their sizes, financial results, and the industry part they have a place with. Firms with specific end goals stay focused, efforts to improve their foundation, put resources into innovations, and gain new hardware and gear. This review recommends another practical structure for analyzing why assembling firms contribute to obtaining new devices and gear, keeping in mind the end goal to enhance their foundation. Digital innovation is the fuel of the growth and support for high income.

The future depends on the company's capability to rapidly take the biggest and improved innovation to market. In a quickly shifting market, the value of innovations

is just mature. Improving or quality innovations are dependent on the companies' expenditure on research and development. For example Unilever, Research and Development treated as an investment associated directly with their larger business strategy. Health and energy are among the mainly critical consumer need. People look forward to science and technologies to help them accomplish their objectives.

Companies search to build Research and Development ability in all of their key market to grow greater consumer perception and recommend solutions close to their consumer. Many companies come across their appearance many challenges. Companies compute their profitability using the practical instrument net income (NI). Therefore, a high ratio indicates the capability to manage business dealings. There is no rule to understand this ratio. Whether the company's business regularly improves its profitability, the analyst ought to evaluate the ratio with the prior years' ratio, the industry's average, and the budget net income ratio. Using the net income ratio in combination with the asset turnover ratio helps ascertain how gainfully the asset has been used throughout the era.

## **LITERATURE REVIEW**

### **Organizational innovation**

Earlier investigating and researching, the choice to enhance could be a crucial choice for firms. Once a firm chooses to be enacted in development, the companies devote assets to the development strategies which are affected by the company's measure of trade quality, and advancement of the workers' uniqueness (level of capabilities).

Vitoliņa B et al. have made significant inquiries about innovations that have a positive effect on the firm execution of SMEs in prove of Pakistan. Besides, the study has made a significant ponder on SMEs in Malaysia and examined that organizational development features a noteworthy and positive relationship with financial performance-related execution.

Alam. K et al., 2022. Having considered the effect of information and communication technologies on the advancement of exterior and inward correspondence expect a noteworthy portion within the improvement execution of SMEs. In that case, energetic organizations, particularly new modern companies with information and communication innovation capacities, appear a prevalent advancement capacity.

Klomp and Van Leeuwen, 1999, and Lööf et al., 2001) Defined R & D as one of the foremost common indicators which impact the innovation choices but, on another side, it had numerous limitations on the innovational concern.

Polder et al., 2010 assessed details strategy that just changing the item's presence and not the element and practicality of the item is similarly encouraging improvement. Encouraging improvement is automatic advancement. Firms get developments their public relations technique to get the efficiency of their business. Presenting development is increasing new procedures and methods for advertising. Growing

particular strategies, techniques, and tools for showcasing has great measure on the success of relations. Promoting expansion is ‘change paths for assembly customer ‘records.’ Now organizations operate PC software design to collect consumer figures. The particular trading arrangement of online shops is a similar case of public relations progress OECD, 2005).

### **Organizational investment**

Prior researches in the private sectors show that IT speculations are decidedly connected with firm performance as far as market worth, benefit, and efficiency. Ali A et al., 2021.

These investigations have fundamentally utilized the asset based view and creation work model to evaluate firm performance. We consider investment as issuing obligations, the organization acquires from different sources (Ferri, 1979).

One method for giving obligation is through a bond. Bonds can likewise be issued to the general population (PBO) or published to choose specialists (Private Bond Placement). The banks are alluded to as bondholders. As obligation instruments, securities are a less expensive source of external capital for the organizations particularly when financing costs are generally less. On the other hand, (imports might bring machinery / equipment exemplified trend setting innovation from few inventive countries into homegrown production), economies have high possibility getting a benefit from innovation diffusion. Saleem H et al., 2019.

It focuses on considering the elements that impact the level of capital devoted to innovations procedure. On the one hand, products are effectively developed by applying advanced technology. On the other side, organizational innovation can be measured if they exist significant expenditure on R & R&D. Additionally R&D funds are the sole indicator for the innovation, along with a number of passionate workers to R&D to improve the organization’s performance. At the very beginning of 1980, researchers developed new indicators. Further, studies have also been done by large institute as OECD and the European Commission. In 1992, the community innovation survey (CIS) started the experimental studies, which were based on the concept of the national innovations system (NIS)

In liquidation investors rank higher (have a higher claim on resources) than shareholders and are accordingly paid first. This is on account of investors being leasers. They don’t contribute to the company’s productivity. Likewise, bonds must have a characterized term (development) after which they are retrieved rather than stocks. Stocks might be exceptional uncertainly. For the most part, returns on bonds are lower than those on stocks but are a significantly more secure venture. Bonds’ security and steadiness go about countering the vacillations typical to stocks (Shibira, 2003).

Investment environment issues for profitability, expenses, benefit rates and the development rates of yield, vocation, and capital stock at the firm level, in pieces of clothing and comparative areas.

We see these outcomes as predictable with the bigger writing on the significance of foundations and strategies for monetary development. Uncertainty on pleasing in innovation, the innovation strength essentially be measured.

## **Organizational performance**

In this study organizational performance measures the innovation and investment of the firm to calculate the financial indicators like issuing long term loans & bonds, purchasing the plants and machines and expenditure on research and development. However, organizational performance is mainly dependent on the firm's financial performance.

Gopalakrishnan (2000) concentrates on a financial arrangement with the measurements of the increase in profit, return on investments, and return on assets. Accordingly, many researchers studied that worlds more organizations have inspired to take advantage from the emerging technologies after the huge growth of information technologies such as mobile, cloud computing, big data and social networking.

However, investment in IT and complementary activities .If these investment are actively managed, they can create organizational value (Pashutan W et al., 2022).

In addition, the innovation performance could be analyzed with their indicators. Numerous associations use IT in their everyday tasks. Notwithstanding, IT without help from anyone else doesn't give direct advantages rather it relies on how agile they are in utilizing IT to make advancement at every authoritative level Ali A et al. Suggested that IT assets in open area upgrade development capacity, among others, which accordingly works on hierarchical execution as far as public worth.

The arrangements are away from being a simple phenomenon; they are diverse conceptions (Cameron et al., 1986).

Given statement organizational performance is essentially contradictory because, from a particular point of view, it may be indicated better performance, whereas, from another viewpoint, it may be indicated. In addition, Zammuto (1984) showed that people might have multiple preferences on the most relevant aspects for evaluating performance.

## **Problem Statement**

A study is necessary to examine the impact of investments such as digital innovation kinds including Research and developments expenditure and increases in sales market share in innovative marketing viewpoint issuing the bond and long term loans and other purchases of new plants and machinery on a particular aspect of firm performance of the organizations similar to Sales growth, Return on Assets and Net income performance of manufacturing organizations in Pakistan because literature has shown that Pakistani Digital Firms and Organizations are struggling

to compete with desiring abilities and skills, including technology improvement and employee training, in increasing international markets.

## **Research Gap**

Most of studies examined innovation and net income or new investment and net income over past years in the global context. In Pakistan context, there is few studies use innovation and investment on Pakistani Firm's Net Income or Gross Income.

## **METHODOLOGY**

### **Research Objectives**

The main objective of the study is to walk around the impressions of innovation and investment on multiple characteristics of firm performance, such as creative production, Research and Development overhead and the financial performance of organizations in Pakistan. Product development instructs showing the new product and benefits or bringing fundamental change in the present element and administrations. The indicators of innovative performance are Research and development ideas, new item declaration, patent reference and the patent number Organizational development is a better approach for sorting out routine exercises. For authoritative development firms change the technique for arranging that firm has not actualized recently.

### **Research Hypotheses**

**H1:** In Pakistan context, Investment is more causes and effect on Net Income of Firm or insignificant effects.

**H2:** Digital Innovation is more causes and effects on Net Income of Firm or insignificant effects.

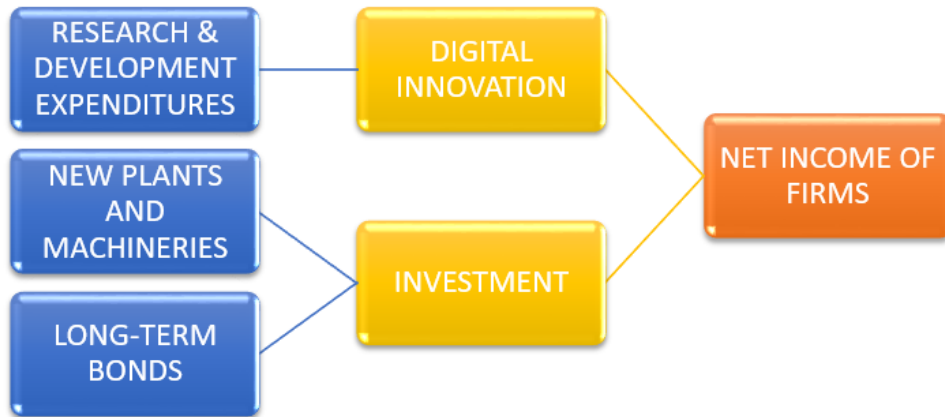
### **Data Collection**

The study includes a quantitative base analysis with study questions which requires to cause and effect of variables; Research & Development Expenditures which is used as proxy variable for Digital Innovation, Long-term Bonds, and New Plants and Machinery which are proxy for Investment, on Net Income of firm over time period. In this case, Balanced Panel Data consist on 30 Pakistani firms from different sector, such as; Pharmaceutical, Automobile, Telecommunication, Textile and Electronics through Annual Reports of Firms since 2012 to 2021.

### **Model Description**

This study uses Balanced Panel Data for Fixed Effect (or Least Squares Dummy Variables) Model, because SBC, AIC, DW, and R-Square criteria recommend to Fixed Effect model and it has different constants for each firm.

$$NET\ INCOME_{it} = \alpha_i + \beta_1 RESEARCH\&\ DEVELOPMENT_{it} + \beta_2 NEW\ PLANTS\ AND\ MACHINERIES_{it} + \beta_3 LONG\ TERM\ BONDS_{it} + \mu_{it}$$



## RESULTS

According to Methodology, Results divided into four sections; Levin, Lin & Chu test for unit root of data, VIF test conducted for Multicollinearity, Hausman test conducted for model selection between Fixed and Random Effect models, at last, Model interpretation for stochastic model.

### Units Root Test (Levin, Lin & Chu \*)

Panel data also has time-variant variables which must be stationary, otherwise, model become spurious regression because non-stationary data create Autocorrelation and Multicollinearity problems with non-constant mean and variance of residuals. Many studies recommended Levin, Lin & Chu Unit Roots test for checking non-stationary of data series. Below table of Units Root Test, shows p-value less than 0.05 which concluded no units root in each data series and shows stationary at level.

RESEARCH AND DEVELOPMENT	-5.03254	0.0000	At Level
PURCHASES OF NEW PLANT	-7.98475	0.00166	At Level
ISSUING LONG TERM LAONS	-2.98744	0.00988	At Level
<b>Dependent Variable</b>			
NET_INCOME	-3.87253	0.0001	At Level

### Multicollinearity Test (VIF Test)

VIF (=1.27) result shows that there has not detected Multicollinearity problems within dependent and independent variables because VIF value is less than 5.

### Hausman Test for Model

Hausman test is a selection criterion for model between Fixed and Random effect model, if Hausman test shows p-value greater than 0.10 than Panel Data has Random Effect Model, otherwise, Fixed Effect model uses which show causes and effects through regression analysis. Correlated Random Effects-Hausman Test shows p-value less than 0.10, it assure to use Fixed Effect Model.

Correlated Random Effects - Hausman Test

Equation: Untitled

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	6.692401	3	0.0824

Table 2

### Model Interpretation

Fixed Effect is used which shows that two variables are significant values because it is less than 0.05 as research and development has 0.0000 considerable value. Their coefficient value is positive as 0.0895443 means it has a positive impact on the firm's net income which improves the performance. And the other side purchase of new plants and machinery also has a significant value is 0.0000 and it has a positive impact on purchases of new plants and machinery. To run the data result of the Adjusted R-square value is 0.915239 means there is a change in firm performance



due to these independent variables approximate 10% change occurs due to other factors which means the model is fit. This model is significant because F-statistics is greater than 4.5 or we may say it is positive as 450.9128. Hence, the run test is relevant because the value of Probability (statistics) is 0.000 which is significant. It has proved that the test we have run is appropriate. R square value is 0.917273 which means when companies increase one unit of the investment on the bases of R&D, and purchases new plant and machinery, firms increase their income which creates a change of about 91% in firm performance because the Adjusted R-square value is 0.917273.

Dependent Variable: NET\_INCOME

Method: Panel Least Squares

<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
RESEARCH_AND_DEVEIOPMENT	0.112578	0.010540	10.68154	0.0000
PURCHASES_OF_NEW_PLANT	0.026866	0.019775	1.358569	0.1775
ISSUING_LONG_TERM_LAONS	-0.000281	0.000972	-0.289079	0.7732
C	1.17E+09	2.40E+08	4.864642	0.0000
R-squared	0.948057			
Adjusted R-squared	0.930927			
Prob(F-statistic)	0.000000			

According to model, the p-value of giving long term loans and bonds is greater than 0.05 which means that there is no significant relation between issuing long term loans and firm performance. But other side, In model, the p-value of R & D is less than 0.05 and there is a significant relation between R & D and firm performance and p-value of assets of plant and machine is less than 0.05. It means a significant positive relation between purchases of plants & machines and firm performance. There will be a positive effect if companies focus on the R & D for innovation and invest in purchasing new plants and machines.

## DISCUSSION

In Pakistan, this study worked on innovations and investments to impact the organization's performance. This study found that it has many aspects that affect the firm's performance. Statistics of the research were composed of annual reports of 30 firms. The significance of innovation and investment for organizational performance has been discussed widely in recent years. In consideration (Paul, 2017) innovation is specific ideas, practices and aims. According to the OECD (2005), a firm's innovation is nothing new that would be original but the new behavior produced after the company's adaption. At present, some organizations insist on focusing only on the sources of information internally to show their effectiveness and innovations.

The relationship between investment and innovation has been shown in the organization's performance. According to Paul, 2012, internal knowledge and innovation are bound. On the other hand different technologies and markets are crucial to creation. As I have used the penal least squares to run the data which shows that 2 variables are significant value because it is less than 0.05 as research and development have considerable importance. Their coefficient value is positive as 0.0895443 means it has a positive impact on the firm's net income which improves the performance. And the other side purchase of new plants and machinery also has a significant value of 0.0000 and it has a positive impact on purchases of new plants and machinery.

## CONCLUSION

The study tested a hypothesis related to innovation and investment performance linked using data collected from the annual report of 30 firms operating in different industries in Pakistan. Including Pharmaceutical, Auto Mobile, Textile, etc. The study supports the proposed planned hypothesis thus emphasizing the role of digital innovation and investment capabilities on firm performance. The study confirmed the happy relationship between investment and innovations in the performance of organizations. The finding implies that innovation becomes the competitive advantage when used by new research and development strategies. Innovation also desires to adopt new ideas. The happy relationship between R & D and purchases of new plants is valuable for firms that seek to outperform their competitors through innovation and information.

Eventually, this study consigned the group of considerations shown as additions and road maps for new studies. The empirical study of different business sectors focused on this study. Furthermore, studying in various industries assists the control of specific situations like the performance of companies. The result might be limited to this scope of the study. In other contexts, research should be expanded. On the other hand, the strength of the study is research and development.

## REFERENCES

- Alam, K., Ali, M. A., Erdiaw-Kwasie, M., Shahiduzzaman, M., Velayutham, E., Murray, P. A., & Wiesner, R. (2022). Impact of ICTs on Innovation and Performance of Firms: Do Start-ups, Regional Proximity and Skills Matter. *Sustainability*, 14(10), 5801.
- Ali, A., Iqbal, S., Haider, S. A., Tehseen, S., Anwar, B., Sohail, M., & Rehman, K. (2021). Does governance in information technology matter when it comes to organizational performance in Pakistani public sector organizations? Mediating effect of innovation. *SAGE Open*, 11(2).

- Baumane-Vītoliņa, I., Woschank, M., Apsalone, M., Šumilo, Ē., & Pacher, C. (2022). Organizational Innovation Implications for Manufacturing SMEs: Findings from an Empirical Study. *Procedia Computer Science*, 200, 738-747.
- Geroski, P. A., S. Machin & C. F. Walters (1993), The Profitability of Innovating Firms, *The RAND Journal of Economics* 24, 198-211.
- Günday, G. U. (2011). Effects of innovation types on . . *International Journal of Production Economics*, 133(2), 662-676.
- Gunday G, (1986). Effects of innovation types on firm performance. *International Journal of Production Economics*, vol.662, p676.
- Hall, Robert E., & Charles Jones. 1999. Why Do Some Countries Produce So Much More Output per Worker than Others? *Quarterly Journal of Economics* 114(6), 83–116.
- Hamel G, 2009. Management innovation Leadership Excellence.p26.
- Hassan, M. U. (2013). Effects of Innovation Types on Firm Performance.*Pakistan Journal of Commerce and Social Sciences*, 7 (2)7 (2), 243-262.
- Kortum, K. J. (2002). ON THE RELATIONSHIP BETWEEN INNOVATION. Royal Institute of Technology, *Industrial Economics and Management*, 36.
- Lööf, H., A. Heshmati, R. Asplund & S.O. Naas (2001), innovation and Performance in manufacturing industries: a comparison of the Nordic countries, SSE/EFI working paper series in economics and finance no. 457, pp. 38.
- Ndubisi, N. O. (2015). Innovation strategy. *Journal of Service Management*, 564.
- Kline S. J. & N. Rosenberg, 1986, An Overview of Innovation, In R. Lindau, N. Rosenberg (eds), *The Positive Sum Strategy, Harnessing Technology for Economic Growth*, Washington DC: National Academy Press, pp. 275-305.
- Kleinknecht, A. (1996) New indicators and determinants of innovation: an introduction, in Kleinknecht, A. (ed.), pp. 1-12.
- Lööf H. and A. Heshmati, 2002, Knowledge Capital and Performance Heterogeneity A Firm- Level Innovation Study, *International Journal of Production Economics*, 76 (1), 61- 85.
- Luecke, R and Katz, R (2003) *Managing Creativity and Innovation*, Harvard Business School Press, Ma.
- Oecd. (1999). *On The Relationship Between Innovation*. Royal Institute Of Technology, *Industrial Economics And Management*, 36.

- Pashutan, M., Abdolvand, N., & Harandi, S. R. (2022). The impact of IT resources and strategic alignment on organizational performance: The moderating role of environmental uncertainty. *Digital Business*.
- Paul, K. (2012) The role of external knowledge in open innovation- A systematic Review of literature. *Proceedings of the European Conference on Knowledge Management*, p592.
- Saleem, H., Shahzad, M., Khan, M. B., & Khilji, B. A. (2019). Innovation, total factor productivity and economic growth in Pakistan: a policy perspective. *Journal of Economic Structures*, 8(1), 1-18.
- Shahzad, F., Du, J., Khan, I., & Wang, J. (2022). Decoupling Institutional Pressure on Green Supply Chain Management Efforts to Boost Organizational Performance: Moderating Impact of Big Data Analytics Capabilities. *Frontiers in Environmental Science*, 600.
- Zammuto, R. (1984) A comparison of multiple constituency models of organizational effectiveness. *Academic Management Review*, vol. (606), pp16-9.