

Importance of Innovation in Manufacturing Sector: A Case Study of Fan Industry

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Abstract

This study attempts to assess the important determinants of innovation in case of fan industry of Gujrat, Pakistan. It is a sectoral analysis to empirically identify the role of different internal and external characteristics of innovation in enhancing the financial performance of firms. Sample of the study comprises of 100 firms (10 large, 60 medium and 30 small firms). With the tool of questionnaire, empirical analysis is carried through the descriptive analysis. The estimated results indicate that most of the small and medium firms are not paying much attention to innovation due to competitive markets, expenditures on innovation or low demand of their products. On the basis of the findings of the study it can be suggested that the investment on innovation can pay back in improving the productive capacity of these firms.

1. Introduction

Innovation plays a critical role in enhancing the competitiveness, productivity and GDP growth of countries. Along all other factors it is considered to be a key ingredient in the efforts of developing countries to catch up with other emerging economies of the world. Due to its crucial role, the World Economic Forum considers innovation as one of the twelve pillars of its widely disseminated Global Competitiveness Index. Therefore in this contemporary era of competitiveness it is essential for developing countries to focus on this key factor to enhance their economic growth.

In case of Pakistan economy, a historical review of its economic growth shows that the pace of growth has been slow. Recently our growth rate accelerated to 4.14 percent in 2013-14 against the growth of 3.70 percent recorded in the same period last year (Economic survey 2013-14). To enhance this growth rate and maintain its stability, we need to focus on balanced growth of all the sectors particularly manufacturing sector. As it is playing an important role in growth of economy of Pakistan and emerged as third largest sector, after agriculture and services sector (Naz et al. 2013).

In literature, several studies have explored the role of manufacturing sector in economic development of Pakistan and some concluded that this sector lacks innovation in different aspects (Mahreen & Ahmed 2011). according to the World Economic Forum Global Competitiveness Report 2013-14, Pakistan ranked 133 among 148 countries due to less innovation and lack of competitiveness.

Historically, organizations may survive with very little innovations (Mahmud, 2011). They focus only on quality of products which may be useful for customers for long period instead of changing it each year.

Customers on the other hand, due to lack of awareness and absence of globalization, did not change their preferences or taste for existing products. But with the passage of time and technological improvements, there is an increased push up of customer's choices and they diversified taste for given products. This invoked the organizations to innovate. Today, organizations are more concerned about their survival rather than products. And this can only

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happen with the help of innovative process and management that can reduce the cost of firms as well as customers and this can trigger the efficiency of any organization.

In this age of competition, especially manufacturing firms want to compete with others to gain the maximum share of market. And this can only be possible if your product differentiates either by price or by fashion from your competitors. Importance of innovations cannot be denied at any area of life. New ideas and innovations also change our lives and increase our standard of living. We now have more opportunities to get maximum benefits with less cost. Because it helps us to discover different options that exist now and are likely to emerge in the future to improve our livelihood. This study also supports the evidence that innovations are not always about invention (Ahmad, 2008) gave a new product or service but also focus on existing technologies to improve the efficiency of product at low prices. One of the most important concepts in economics is willingness to pay, also affected by innovations of organizations. Customers may be more willing to pay for new or well designed product rather than cheaper outdated.

Innovations also play a significant role for an economy to attain its certain goals. Like, if domestic firms increase in innovations it can lead to increase their product demand in domestic markets as well in foreign markets. Higher demand can also trigger production that can generate more employment opportunities in country. Due to increase in employment, country's overall income rises which makes a feasible business climate in country and encourages investment and due to increase in exports, external sector will also be in balance. As Hall, (2011) found that there is significant effect on revenue productivity and thereby on growth of firms of product innovation. Hence the definition of innovation provides basis for this research as the focus of this study is to examine the relationship among different types of innovation (product innovation, process innovation, Marketing innovations and Organizational innovations) and organizational performance.

This paper especially focuses on, Fan Manufacturing industries of District Gujrat, Pakistan. It intends to check their marketing performance through innovations. Especially, it pays more attention to their competitiveness through brand building. It captures how firm's brand ensures its existence in international market.

2. Literature Review

Verdier (2010), investigated firm productivity innovation and financial development in case of an emerging economy. They employed firm level data from both developed and developing countries from the World Bank Enterprise Survey (WBES) conducted between 2005 and 2007. The study has considered 63 low income and advanced countries. It has incorporated different control variables in the analysis like business climate constraints, financial development and output per worker. The empirical estimates of a semi log model showed that those firms who innovate tend to be more productive. And this innovation has economically and statistically significant effect on output per worker. Their findings suggest that a firm that adopts new technology or develops a new product line is 7 percent more productive relative to that firm that does not engage in these activities. This study suggests that productivity has strong relationship with not only innovation but with sound financial system as well.

A methodological extension of Verdier (2010) can be seen in Yanrui (2010) it is an analytical framework to link, Innovation and Economic Growth in China. This study reveals that by employing the same methodology. For model estimations this study used the panel data covering the period over 1998- 2007. Unlike the former study it has restrained the problem of simultaneity by employing the, Hausman specification test and two stage least squares method. The estimation results have confirmed that, research and development positively affects the rate of innovation and later innovation outpaces the economic growth,

other things being equal. However these results can be robust if the role of institution (social and economic) is also included in the analysis. Because infrastructure development, the degree of economic reform, government spending, foreign capital and human capital endowment also play a role in affecting economy's innovation and economic growth.

Another broader view of the issue is discernible in a study by the Mahmud, (2011) which examined the determinants of innovative behavior for manufacturing firms in Pakistan through product, process or both. An interesting feature of this study is that, it classifies the firms in to two categories namely i.e internal (size, age, ownership structure and past performance) and External (geographical location, demand growth in industry, industry concentration and government policies). The study used panel data of Pakistan Investment Climate Assessment Survey conducted by the World Bank in 2002 and 2006-07. The panel consists of 402 manufacturing firms of which 107 firms (26.7%) innovated either by introducing new products, new processes or both. To remove the problem of endogeneity, this study used the lagged values in its model. One interesting feature that makes this study differs from others is that, it uses dummy variable as dependent. On the other side, it has beautifully mentioned the internal characteristics (trade status, size of the firm, growth of the firm, quality of the top manager and the organizational type) as predetermined dummy variables. The estimated results by Probit model showed that the internal characteristics of firm play a significant role in it's steps towards innovation.

One thing which is familiar for all of us is that, agriculture plays a crucial role in manufacturing sector by providing raw material and also market for manufactured goods. So the question that how innovations increases the productivity of this sector is being addressed by Ahmad (2008), which assessed trends in total factor productivity in Pakistan agriculture sector. The main objective of this study is to estimate total factor productivity growth in Agriculture sector of Pakistan by reviewing the existing studies, methodologies and different sources of data. This study has also mentioned the variation in capital stock and variation in labor force (skilled, level of education and training) which makes it separate from already existing studies. This study used the time series data of period from 1965-66 to 2004-05. This study has used solow growth model for estimation because this method is capable of decomposing the contribution of factor inputs and technological change to output growth. The estimation result of this study has showed that the average growth rate of total factor productivity remained low due to the less innovation in capital stock and lack of information. This study has suggested that the government should devise appropriate policies, such as diffusion of relevant information among the farmers, increased area under cultivation and timely availability of fertilizer at affordable prices for the farmer, to promote growth of agriculture TFP in the country.

Due to the strategic importance of innovation, many studies are available to answer this critical term. As Nawaz (2014), has analyzed the impact of knowledge management practices on firm Performance. It has beautifully captured many possible dimensions of innovations. This study has examined the relationships among knowledge management dimensions (knowledge acquisition, knowledge dissemination, responsiveness to knowledge), innovation and financial performance. For this analysis data is collected from manufacturing sector of Pakistan. It includes Karachi Stock Exchange Listed firms representing twelve manufacturing sectors, representing mainly textile, FMCG, cement, petroleum, fertilizers, pesticides, chemicals, electronics, pharmaceuticals and other sectors. This study has used Questionnaire tool for data collection.

A complementary link in innovation and productivity growth is being identified by Hans (2004) has brought forward a comparative perspective about the relationship in innovation and productivity in service and manufacturing industry. It has considered a unique combination of a large number of knowledge intensive firms (607 from manufacturing and

538 service firms) from Swedish economy. It has used the questionnaire method and has estimated a production function. The empirical results showed that there exist a significant positive relationship in R & D, innovation and productivity in all types of firms.

An informative case study has been carried out in case of Pakistan by Naz et al (2013). The study has analyzed various aspects of innovation and importance of its role in enhancing the productivity growth of manufacturing sector of Pakistan. The data for the study was collected through the questionnaire method by surveying about 250 manufacturing units from Karachi. The estimated results of reliability and factor analysis showed that high performance of firms is strongly correlated with increased innovations in the firms in sample. The possible determinants of innovation in small and medium enterprises in case of Malaysian economy are discerned by Lee & Ging (2007). The study has briefly outlined the literature in this sector and explained the reasons of less focus on SME research in this area. Size of the firms, type of their ownership, their technological exposure and role in market concentration were identified as the main determinants affecting the productivity of the firms. It has further concluded that younger and small sized firms were more likely to innovate as compare to old and large ones. The availability of technology also plays a significant role in enhancing their productivity through innovation.

3. Theoretical Framework

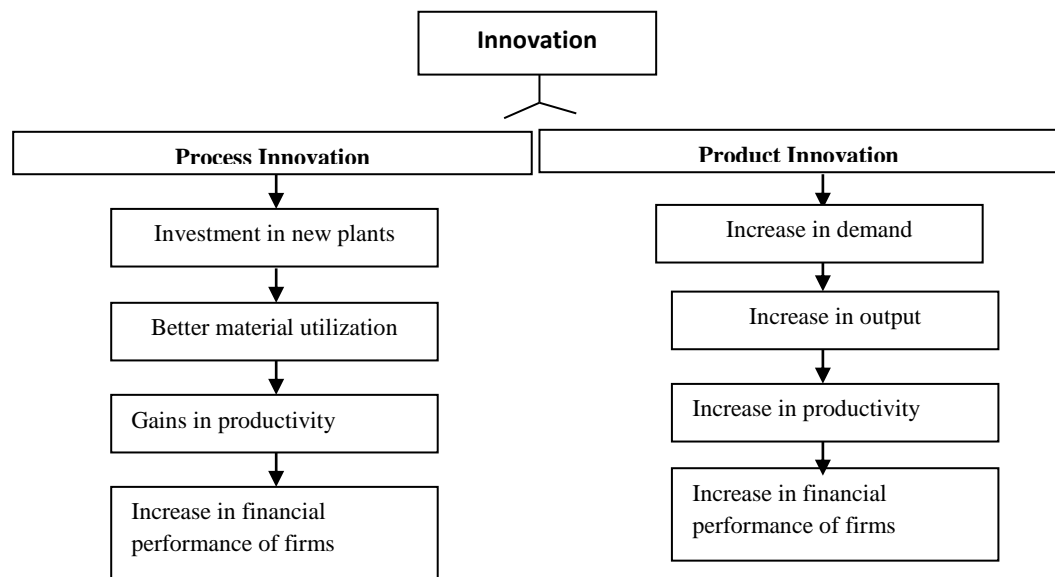
Following the conclusions drawn by the above reviewed studies, the current study will examine the relationship between the innovation types (product, process), size of firm and trade status, (internal characteristics of firm) on financial performance of firm. This study will also explore the link between the external environment and firm's financial performance, i.e if it exists in competitive environment then how this competition affects firm's performance. And the aim of study is to explore these relationships in Fan Manufacturing Industries of District Gujrat, Pakistan.

According to (Polder, 2010) product innovation means introducing the new product/ services or bringing significant improvement in existing product/ services. So we must keep in mind for product innovation, product should either be new or improved in its features like easily usage or components and material. In this era of globalization firms have to innovate new products to survive in the international markets. This product innovation will help the firms to enhance their efficiency and competitiveness. The main advantage of product innovation for the firm is that it face the low competition at the time of introduction and in this way it earns higher profit (Roberts, 2003). Thus we can say that product innovation is one and most important determinant that affects firm's revenue.

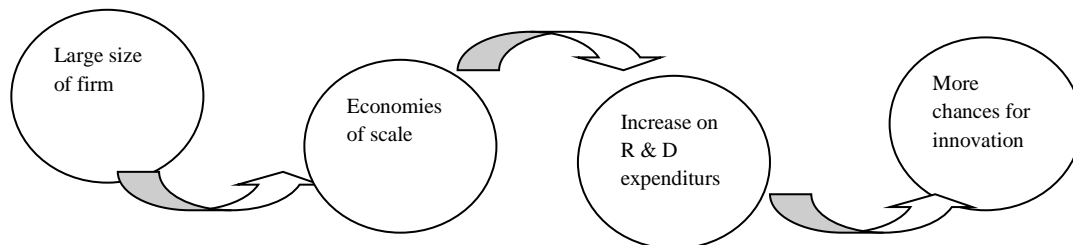
Secondly, Process innovation simply stand for improving all the traditional methods of production and logistic or in simple words, bringing significant improvements in the supporting activities such as accounting, maintenance and computing (Polder, 2010).

In the competitive environment like today, it is necessarily for a firm to satisfy its customers' needs otherwise they will simply switch to another firm's product. For example delivery method for which we simply understand the movements of product from firm's floor to the end user. This is the traditional method of delivery if it is improved such as computer system, tracking system or any associated system that is more feasible for customers then this is a process innovation. It means any differentiation in product of the firm can also be regarded as an effort to enhance its financial performance.

As we can precisely see the above discussion in the following diagram



Size of firm can be defined as in term of no of labors in any firm. In the current study it has been defined for the small firm less than 20, medium 20 to 100 and for large firm more than 100. The size of the firm can also be termed as a potential determinant in the decision of firms to innovate. A larger size will convince the producer to spend more money on research and development as he will be able to avail many internal and external economies of scale. Brand of firm can be defined in term of it's trade status. Usually it can be seen that larger firms are more exporters than smaller ones. We can explore this hypothesis empirically in this paper in case of fan industries of district Gujarat, Pakistan.



4. Methodology

Regression analysis has been carried out with the help of SPSS 17 to investigate the impact of three dimensions of knowledge management (knowledge acquisition, knowledge dissemination, responsiveness to knowledge) on innovation and financial performance. Factor analysis and reliability analysis (Chronbach's alpha) are used to test the validity and reliability of the questionnaire measures. This study has been showed that all the three dimensions of knowledge management (knowledge acquisition, knowledge dissemination, responsiveness to knowledge), leads to innovation and financial performance significantly.

Managing this knowledge more effectively by organization gain competitive position in the turbulent environment. The findings of this study will contribute in literature by providing first empirical evidence of innovation in the relationship between knowledge management and firm performance particularly in case of fan industry of Gujrat.

The study is based on the primary data, from district Gujrat, Pakistan. It has concentrated on the sample of Fan manufacturing industries, small, medium and large. The current Study will look at the important decisions that firms made about their innovations.

With the close ended type of questions, it collected the information about firm's innovation measurements as well as their decisions about innovation strategies. It has also discussed firm's future planning regarding to innovations, all of, small, medium and large firms. The information collected from the firms about their workers training, is also included in this study. Similarly, a brief discussion about firm's trade status and its external competition as well as role of modern technology is also the part of this study. The devised Questionnaire contains questions about different aspects of innovation like,

- Information about firm's innovation strategies is gathered with the help of different questions like, importance of innovation for organization, role of research & development department in any firm, current situations of workshops for employees on innovation.
- External characteristics of firm are inquired by its trade status, competition among different firms, and market demand of its products and the role of modern technology in innovations.
- Firm's internal characteristics are analyzed by its size of employees, research and development department and training of workers.
- Respondents were asked the reasons, why and why not they are doing innovations. Different type of descriptive analysis like frequency analysis and percentage analysis are applied to answer s study questions.

5. Data Collection and Estimation

Data is collected from the sample of 100 firms in which, 30 small firms, 60 medium firms and 10 large firms are included. Questionnaires were provided them by hand and they were requested to fill them in mean time. In this way all respondents record their response about the study.

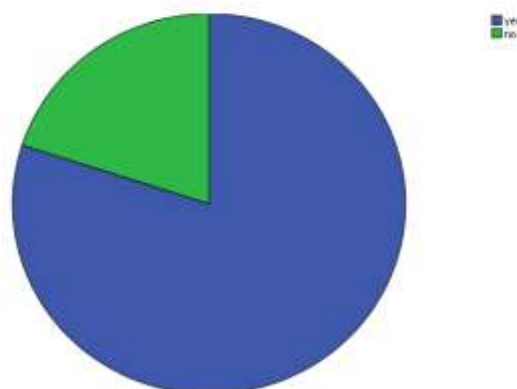
6. Results and Discussions

6.1 Frequency Analysis

The frequency analysis is carried to derive the results about main study questions. Respondents were asked about importance of innovations for their organizations and their responses show following results.

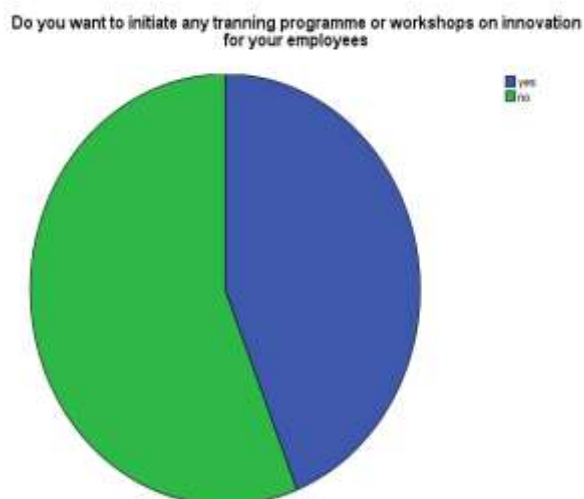
80% firms say yes, innovations are important for them and 20% says no. Firms that tend to innovate, according to study, most of them are medium and large firms, and those which says no, mostly are small firms.

Do you think that innovation measurement is important for your organization

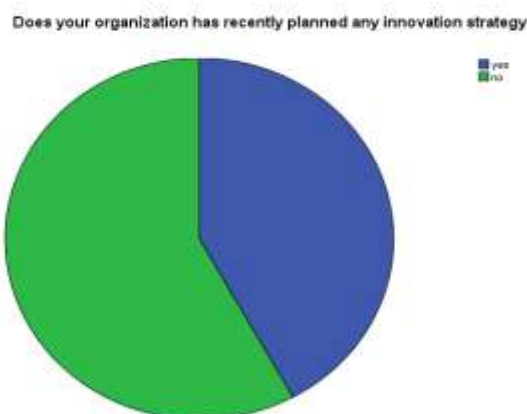


Similarly when firms were asked about initiating programmes or workshops on innovations for working employees, their response were different although they are working on same scale of production, 44% said yes and 58% said no. Mostly, small firms did not want

to initiate any training programme or workshop and these are 30% of total sample. Some of medium firms approximately 20 % also didn't want to initiate any programme while remaining, medium and large firms want to initiate programmes or workshops for their employees on innovations. Because a small or starting level entrepreneur has to face a lot of entry barriers in form of financing, technological constraints, and in some administrative spheres as well.

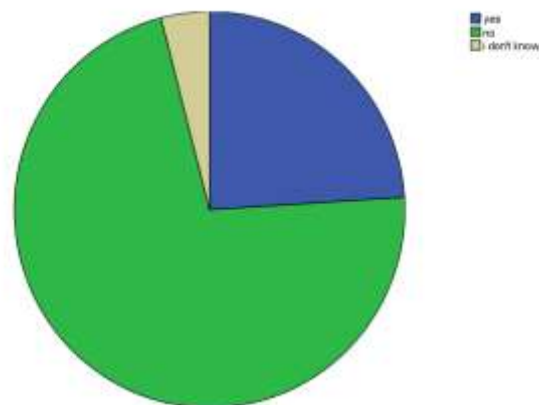


Question about recent planned innovation strategy by the firms, also showed a historic trend of developing countries, i.e, small firms and some of medium firms said no, they haven't enough recourses for research purposes while mostly large and some of medium firms said yes and they also doing research on low consumption of electricity's fans. Overall results showed that 58% firms from sample, (includes both small and some medium) said no. While 42% said yes, and in most of them are large and some are medium firms. This situation is emphasizing on the need of practitioners in manufacturing industry who can initiate performance oriented policies for innovation



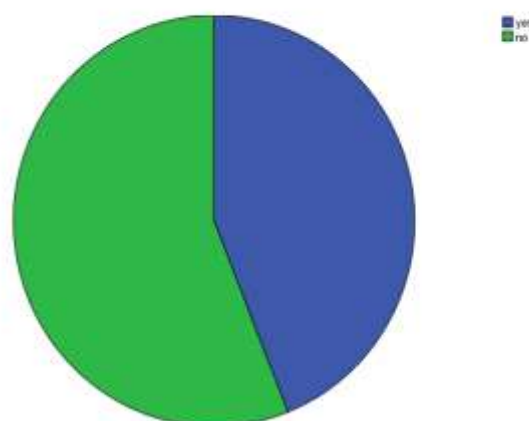
When the firms were asked about the hiring of analysts to design innovation strategies, 24% said yes, 72% said no and 4% said they don't know. Thus at individual level he firms have the capacity to improve their skilful management which can be proved as a key component in enhancing the financial performance of firms.

Have your organization hired any analysts to design an innovation strategy



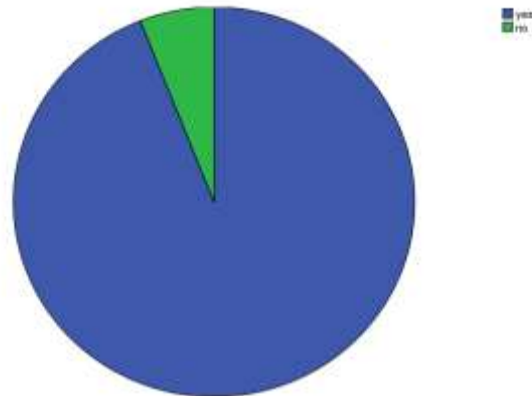
Size of firm also plays a vital role regarding innovations. Our 44% respondent said yes, their firms have capacity, relative to their sizes, of innovations. While 56% said no, their size isn't enough for innovations. Due to advantage of economies of scale large firms are considered to be better able to support innovation but still SME's are also not an exception in this regard. They can also innovate by taking the advantage of lower costs, less entry barriers and more competitive market conditions.

Do you think that the size of your firm has capacity of innovation



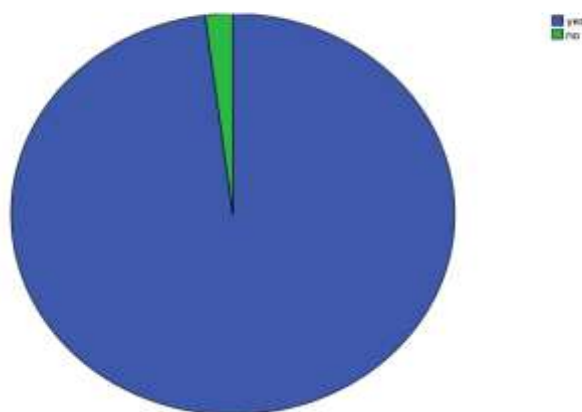
According to literature, external environment also affects firm's productivity. How a firm tends to innovate by its competitor was asked to our respondents. 94% of our respondents said yes while just 6% said no. it means that in a competitive environment the action of a rival firm have a strong potential to affect the decision of any firm.

Do you think that innovation by your competitor can encourage you to innovate



Similarly, firms were asked would they innovate, if market demand of their product increases?. All firms said yes. Results shows that 98% firms said that they tends to innovate if the market demand of their products goes up, while just 2% firm said no. thus increased demand of the firm can stimulate its productive capacities to take the benefit from the improved market conditions or to dominate its competitor in the market.

Can high market demand of your product can motivate you to innovate



7. Conclusion

This study tried to find main determinants of innovations among fan industries of district Gujrat, Pakistan. It has investigated the role of external and internal characteristics on innovation of firm. The possible economic factors which are pushing them away from innovations are found the age of firm, number of employees of firm, scale of production, existence in cluster, expenditures on training of employees and market demand of its product. Most of firms have knowledge that innovations, whether like product or process, are important for their organizations. But results showed that, more than half, firms haven't established any innovation strategy in their organizations. The main factor behind this is their external environment. Due to low international demand of firms in cluster they did not want to innovate. Many firms are facing high international competitions that push them away from innovation. However for domestic purposes, most of firms are doing research on current market demand but this needs time for them to innovate. Most of our firms have acknowledged about the advantages of innovations but externally when they face a tough competition due to modern technology, they haven't enough resources to compete

internationally. This study also concluded that most firms do not give any importance to research and development departments in their organizations even many of them does not establish a single specific room for office purposes. So, if we compare to literature, this study showed that we need 20 to 30 years to innovate according to definition of innovation particularly in the case study of fan manufacturing industry Gujrat, Pakistan.

References

- Ahmad, K., M. A. Chaudry, and M. Ilyas (2008) Trends in Total Factor Productivity in Pakistan Agriculture Sector. *Pakistan Economic and Social Review*.117-132
- Hans, L. (2004) A Comparative Perspective on Innovation and Productivity in manufacturing and industry. *Gainesville International Schumpeter Society*.
- Mahmud, M. and Hamna A. (2011) What Determines Innovation in the Manufacturing Sector? *A Paper presented in a conference in Lahore School of Economics*.
- Nawaz, S. M., Masood ul Hassan and Sadia Shaukat (2014) Impact of Knowledge Management Practices on Firm Performance: Testing the Mediation Role of Innovation in the Manufacturing Sector of Pakistan. *Pakistan Journal of Commerce and Social Sciences*. 99-111
- Naz, et al. (2013) Effects of Innovation Types on Firm Performance: an Empirical Study on Pakistan Manufacturing Sector. *Pakistan Journal of Commerce and Social Sciences*.243-262
- Polder et al.(2010) Product, process and organizational innovation: drivers, complementarity and productivity effects. *A Paper Presented at Maastricht Economic and Social Research and Training Centre on Innovation and Technology*.
- Roberts, P. W., and Amit, R. (2003) The dynamics of innovative activity and competitive advantage: The case of Australian retail banking, 1981 to 1995. *Organization Sciences*. 107-122
- Verdier, et al. (2010) Firm Productivity, Innovation, and Financial Development. IMF Working Paper series.
- Wong, C. and K. Leng Goh (2011) Catch-up Industrialization and Growth Trajectory of Science and Technology: A Comparative Study on Asian Economies. *Paper prepared for the 7th International School on National Systems of Innovation and Economic Development, Globelics Academy*.
- Yanrui , W. (2010) Innovation and Economic Growth in China. A Discussion Paper Series.