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Assessment of Formality, Innovation and Productivity in Small and Medium Enterprises of Pakistan

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ABSTRACT

This study examines innovation and productivity dynamics in Pakistan's SMEs, integrating theories of learning by doing and schooling. It's the first comprehensive study to consider these factors crucial for sustainable growth. Using a structural model, it analyses innovation's impact on firm productivity, based on data from the World Bank's Enterprise Survey (May 2013 - May 2015). Findings show that novel organizational practices significantly drive SME innovation. Enhanced productivity stems from improved organizational structure, training, process restructuring, and export growth. Key strategies for SME growth include export-oriented policies, R&D, training, and structural changes in established enterprises. Encouraging competition among SMEs promotes innovation and productivity. Non-exporting firms should adopt innovative strategies for growth, which benefit productivity and socio-economic status. Higher growth may lead the informal sector to catch up through agglomeration economies. Realizing the state of these aspects provides valuable support to policymakers in developing effective policies for the manufacturing sector.

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Introduction

Small and Medium Enterprises (SMEs) play a crucial role in the economy despite facing significant challenges due to their size and limited resources. Globalization, market integration, and local trends have intensified competition among SMEs, multinational corporations (MNCs), and large domestic manufacturers. This competition, coupled with constraints such as limited capacity, knowledge, skills, finance, networks, information, and a supportive environment, often leads to lower performance for SMEs (Harvie, 2019). According to the Economic Survey of Pakistan (2021), the SME sector accounts for approximately 90% of business activities and

contributes around 40% of the country's GDP. SMEs generate 70% of employment opportunities in Pakistan and contribute approximately 25% to the country's export earnings (McCartney, 2011).SMEs are recognized as the primary drivers of sustainable industrial development in Pakistan, as highlighted in various government policy documents. However, despite their importance for poverty reduction and economic growth, SMEs in Pakistan are not meeting expectations and projections.

There are numerous obstacles to SME promotion in Pakistan. Understanding reasons for success and failure is crucial for SME viability (Raza et al., 2018). Key challenges include political instability, law and order, financial constraints, energy crisis, taxation, labor issues, regulatory reforms, lack of coordination, and limited implementation of sales and marketing strategies (Subhan, Mahmood, & Sattar, 2014; Masood Ul, Iqbal, & Malik, 2018). Despite their significant contribution, SMEs' innovation behavior is often overlooked (Santoro et al., 2018). SMEs exhibit different learning and adaptability mechanisms compared to larger enterprises. They integrate with global trends, practicing various innovations with limited resources (Hungund & Mani, 2019). Competitiveness relies on firms' capacity to innovate in processes, products, and services (Drucker, 1985). Operational and technological innovation significantly impacts economic performance (van Ophem et al., 2002). R&D patterns differ between large firms and SMEs in high-income countries, with SMEs in developing countries facing constraints (Lundvall, 2010; Fu, Mohnen, & Zanello, 2018). Learning-based innovations are critical for SME development in developing countries (Zanello et al., 2016).

Usually, a firm’s growth is observed as a learning process where the survival of the firm depends on the way they innovate and adapt the new technologies and process (Boyan, 1982). This is more relevant in developing countries as sources of innovation are merely the learning process that enables practicing innovation in firms (Bell and Pavitt, 1992).

Over time process and practice of innovation by SMEs have seen a lot of changes. Currently, it has been advocated by experts for firms to follow certain patterns of innovation. Usually, there are internal and external sources of innovation i.e. “Learning by doing’(OECD, 2005) and learning by schooling'(Ellery and Sala, 1999; Schumpeter, 2017) . Research is available on internal or external factors determining innovation among firms but relating it with the firm’s learning behaviour for improvement through practicing and learning the process or methods or by getting training on improved methods of production or processes is still limited (OECD, 2005).

Economics of innovation considers the inventive and creative faculty through a cumulative learning process in firms for improvement in the production process, innovative products, and organization to reduce the cost of the same products or availability of more products with the same cost(Coccio, 2018). It is pertinent that economics literature considers innovation as one of the key sources of economic growth (Grossman and Helpman, 1991). In the conjunction with above mentioned sources of innovation, economic models of endogenous growth theory depict two factors critically responsible for innovation ‘learning by schooling’; adoption of technology developed elsewhere and ‘learning by doing’; indigenous innovative capacity (Fagerberg, Srholec and Verspagen, 2009; Fu, Mohnen and Zanello, 2018).

“Learning by doing”(Arrow, 1971) and “learning by schooling(Lucas Jr., 1988)” models of endogenous economic growth extensively documented and empirically exhibited that lacking these factors can be the greater hindrances in the way of economic growth (Ellery and Sala, 1999). More specifically, the adoption of new technologies and promotion of indigenous innovative capacity are the most rigorous factors of economic growth (Fagerberg, Srholec and Verspagen, 2009). The same is considered true for firm-level growth. As many of the researchers showed that innovations based on new knowledge and skills severs as a key element for firms’

competitiveness (Lengnick-Hall, 1992; Norling and Swanström, 2007; No Kieser and Koch, 2008).

A firm's adoption and level of innovation significantly affect its performance, often reflected in productivity (Goedhuys, Janz, & Mohnen, 2008, 2013; Terziovski, 2010). Few studies explore the link between innovation, productivity, and SME growth. However, they emphasize the importance of identifying strategies beyond productivity (Mano et al., n.d.; Li & Rama, 2015). Data limitations obscure the role of these strategies in determining firm growth in developing countries like Pakistan. This study aims to assess how types of innovation impact firm growth. Numerous governmental and non-governmental efforts support SME development, with special policy emphasis on industrial and economic growth. Despite this, a significant percentage of firms remain informal (Robson, Haugh, & Obeng, 2009). Using World Bank Enterprise Survey data, this study evaluates innovation and productivity dynamics in formal firms. The Crépon, Duguet, and Mairessec (1998) methodology is adapted to assess growth-related prospects. Understanding how firms perceive innovation types and their productivity impact is crucial for stakeholders, as determined through this methodology (Fu, Mohnen, & Zanello, 2018).
The rest of the paper is structured as follows: Section 2 reviews the relevant literature. Section 3 presents the methodology employed by the study. Data analysis is given in section 4. Conclusion and policy recommendations are given in section 5. References are given at the end of the document.

Literature Review

Traditional economic literature hardly focuses on a firm's growth and its determinants (Carpenter and Petersen, 2002). In the early 60s, developing countries like Pakistan formed import substitution policies to support large manufacturing which couldn't bring desirable results in the form of employment, growth, and productivity (Balassa, 1985). As a result, the focus of policies shifted towards export-led growth strategies. Due to the immense importance of SMEs in the promotion of exports, growth, and technological development of country it is relevant to see how small firms are growing. The growth of small firms largely depends upon the way they make technical changes. Industrial revolutions in history are always and everywhere linked with the widespread application of innovation practices by the firms.

Innovation in SMEs is vital for a country's growth, but its recognition in studies was limited until a decade ago. Traditionally viewed as time-consuming, expensive, and risky, innovation often requires significant capital investments (Zanello et al., 2016). Today, innovation remains concentrated in wealthier countries, with only a few firms engaging in costly university research. Imitated innovative strategies have been crucial for Japan and other Asian countries catching up with richer nations during industrialization (Biggart and Guillen, 1999). Developing countries also face the risk of relying on indigenous and foreign knowledge for industry growth. A survey defines innovation in developing countries as the implementation of new or significantly improved products, processes, marketing, or organizational practices (OECD, 2005:46). This includes new discoveries, absorptions, imitations, or improved methods in production, processes, marketing, or managerial tactics (Zanello et al., 2016).

Firms' innovative capacity and capability differ from each other and are influenced by different factors. Innovation required the capability to innovate. Firms relatively perform better with better capabilities to innovate (Dooley, Kenny and O'Sullivan, 2017). Due to this reason, many theorists recognized innovation as a fundamental phenomenon of growth and development (Hurley and Hult, 2006; Schumpeter, 2017).

The role of innovation in developing countries is recognized as the source of access to a variety

of commodities for the lowest income people who are excluded from the formal markets (Chataway, Hanlin and Kaplinsky, 2014). Being economical and ingenuine in nature the poor segment of the population in developing countries is considered the incubator of these innovations. In order to access a wider market, companies often reengineered products to reduce the costs (Bhatti and Ventresca, 2012; Sissoko and Castiaux, 2018). The process of innovation in developing countries is born out of necessity and lack of resources where consumers are the determinant of innovation (Fu, Mohnen and Zanello, 2018).

The literature strongly supports that firms with higher innovation exhibit greater productivity and profits, especially in resource-constrained settings like poor countries (Fagerberg, Srholec, & Verspagen, 2009). Innovative firms grow faster than non-innovative ones (Bhatti & Ventresca, 2012; Dooley, Kenny, & O'Sullivan, 2017; Fu, Mohnen, & Zanello, 2018). Innovation is closely tied to a firm's competitiveness, seen in its ability to innovate in operations and imitate external factors (Slater et al., 2014; Nada & Ali, 2015; Arshad & Arshad, 2019; Nagati & Rebolledo, 2012). Performance is measured by efficiency in converting inputs to outputs, including cost, quality, quantity, capacities, and creativity (Pešalj, Pavlov, & Micheli, 2018).

While crucial, some studies suggest factors beyond innovation influence firm growth in developing countries, with a weaker link seen between R&D and growth (Hausman, 2005). Developing countries prioritize non-technological innovations, gaining significant attention in processes, management, and marketing, particularly in SMEs (Forsman, 2011; Saulina, 2016). Schumpeter's work emphasizes innovation's role in development and growth, distinguishing between 'radical' and 'incremental' innovation (Schumpeter, 1934). Both investment in R&D and learning are fundamental to technical change and innovation (OECD, 2005).

Some studies emphasize cognitive and social dimensions of SME learning. Cognitive factors involve knowledge and preferences in production processes, while social factors entail changes in knowledge use, termed learning (Scott-Kemmis & Bell, 2010). SMEs adapt to overcome knowledge limitations and resource constraints, driven by firm interactions and innovation (Dosi, Grazzi, & Mathew, 2016). Learning includes "learning by doing" and "learning by schooling," with firms varying in intensity based on absorptive capacities (Lucas Jr., 1988). "Learning by doing" improves efficiency through production and operational experience, while "learning by schooling" involves entrepreneur training, crucial for growth (Lucas Jr., 1988). Investment in learning alongside capital investment in R&D is stressed for SME growth. In low-income countries, SMEs invest in knowledge and skill acquisition to enhance productivity (Zanello et al., 2016). Entrepreneur skills significantly influence small firms' innovation pursuits (Barrios, Reficco, & Taborda, 2019). Both "learning by doing" and "learning by schooling" drive SME economic dynamics and innovation pursuit (Dosi, Grazzi, & Mathew, 2016).

Innovation and productivity are intertwined processes crucial for firms, particularly in developing countries where constraints like poor infrastructure and limited resources are prevalent (Klepper, 1996; Fagerberg, Srholec, & Verspagen, 2009). Adopting innovation tailored to the local environment can enhance SMEs' market success (Bigsten & Gebreeyesus, 2009; Crespi & Zuniga, 2012; Khawaja & Iqbal, 2019). In countries like Pakistan, Sri Lanka, Tanzania, and Ethiopia, SMEs grow significantly faster through innovation (Goedhuys, Janz, & Mohnen, 2013).

While many studies suggest a positive impact of innovation on SME growth, some highlight potential negative effects, as it requires substantial resources and may encounter resistance within firms (Atuahene-Gima & Evangelista, 2000; Thornhill, 2006). Innovation is multidimensional, with certain aspects proving more beneficial than others. Overall, innovation positively affects

firm performance, but its specific impact on SME productivity warrants further investigation (Atuahene-Gima & Evangelista, 2000; Thornhill, 2006)
Innovation has a positive effect on the overall Innovation is multifaceted, with certain aspects proving more beneficial than others. Our study will assess how various types of innovation affect SME productivity and performance, specifically evaluating their benefits for firms.

Methodology

In developing economies innovation is attributed to the adoption of technical skills due to financial constraints for practicing R & D activities (Lall, 1992). So, in economies like Pakistan, all institutional, socio-economic, personal, and entrepreneurial factors are given equal weightage for the adoption of innovation. To capture the effect of these variables CDM model Crépon, Duguet and Mairessec (1998) is widely used in literature. In this study, we have used the structural model (Janz, Lööf and Peters, no date; Mairesse and Mohnen, no date; Lee and Narjoko, 2015) to assess the factors which are affecting innovation, and then we will assess how this innovation can affect the productivity of the firms with reference to formality.
The model consists of two main equations determining innovation and productivity. Let the number of firms range from $i = 1, \dots, k$; the first equation depicts innovation

$$I_i^* = X_i'\beta + e_i \quad (1)$$

Here i is a latent variable that captures knowledge production. X_i is the vector of variables determining innovation and β is a vector of coefficients. And e_i is the error term. The Probit model is used to determine innovation. Such as

$$I_i = \begin{cases} 1 \; if I_i^* = 1 \\ otherwise \end{cases} \quad (2)$$

Here I_i is the observed binary variable equal to 1 for practicing innovation in the last fiscal year and otherwise it is zero. While I_i^* is the respective latent variable.
Secondly, productivity is estimated through following equation

$$q_i^* = X_i'\gamma + I_i\delta + v_i \quad (3)$$

Here q_i^* is the capacity utilization which is given as a percentage of total capacity in the World Bank Enterprise Survey. We consider this variable as a proxy of productivity. As productivity of factors is maximum at full utilization (Romer and Chow, 1996). So, they are closely related to each other. X_i' is the vector determining productivity and I_i is the estimated probability of innovation. v_i shows the error term related to the equation.

To capture the innovation in formal and informal firms; we have decomposed the innovation into learning L_i and technical T_i capacities practised by firms. Technical innovations are related to the adoption of new technology or production methods and learning-based innovation consists of improved operational management practices by the firms. Estimation of these two practices; use of latest techniques and learning is given in equations 4a and 4b respectively.

$$T_i^* = X_i'\theta + \varepsilon i \quad (4a)$$

&

$$L_i^* = X_i'\varphi + \varepsilon i \quad (4b)$$

Above dependent variables are the latent variables and posit bivariate probability as

$$T_i = \begin{cases} 1 \; if \; T_i^* = 1 \\ otherwise \end{cases} \quad (5a)$$

$$L_i = \begin{cases} 1 \; if \; L_i^* = 1 \\ otherwise \end{cases} \quad (5b)$$

Above are the binary variables. They will have a value of 1 if a firm is found practicing the activity. Predicted values of (5a) and (5b) are then used to estimate the capacity utilization equation of the firm given as

$$qi = X_i'\eta + T_i\eta + L_i\eta + +ui \quad (6)$$

Data

We utilized data from the World Bank's "Pakistan Enterprise Survey 2013" to fulfill our study objectives. This publicly available data is collected through an improved follow-up survey, mainly focusing on measuring firms' innovation in the private sector of developing economies. The survey, conducted from May 2013 to May 2015 in Pakistan, employs a stratified random sampling method. Stratification is applied at three levels: region, industry, and firm size. Regional strata encompass five regions, including the federal capital Islamabad and the four provinces (Punjab, Sindh, Balochistan, and Khyber Pakhtunkhwa). Industries are categorized into manufacturing and services sectors, with the services sector further divided into retail and other services. The manufacturing sector comprises seven types of enterprises, including chemicals, textiles, garments, food, non-metallic minerals, vehicles, and other manufacturing. Firm size is standardized based on the number of employees: small (5-19 employees), medium (20-99 employees), and large (more than 99 employees) firms according to World Bank definitions. This data set includes the nature and dimensions of innovation strategies adopted at the firm level Detailed information on various aspects of firms and their operational practices is available, including general background characteristics, access to infrastructure and services, sales and supplies, financial status, capacity, competition, innovation, and the business environment. Competition refers to the number of firms producing similar products, both formally registered and unregistered. Innovation encompasses new or significantly improved products or services, including transportation, production support services, managerial practices, marketing, and development, etc.1

Descriptive Analysis

The study focuses to analyse the innovation and productivity of a sample of eight hundred and nine small and medium formally registered firms in Pakistan. Most of these firms are located in Punjab, Sindh, and KP. There are two types of firms according to the sectors i.e., manufacturing and services. The majority of the firms are manufacturing and located in main business cities. Firms belong to nine key industries: food, textile, garments, chemicals, non-metallic minerals, motor vehicles, other manufacturing, retail, and services.

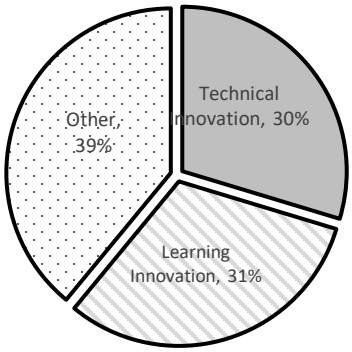

Figure 1: Proportion of Innovative Practices in Firms
Source: Author' own computation for Pakistan Enterprise Survey data (WB, 2013)

The highest proportion of small and medium firms is in the manufacturing industry followed by the food industry in all provinces. There is a very low proportion of innovative practices adopted by small and medium manufacturing firms i.e. 30%; however, this is consistent with evidence observed in other developing countries (Hall, Lotti and Mairesse, 2009). There is an approximately an equal proportion of innovative practices based on skills development and production techniques.

[1] For variable description and detailed definitions see table 1A in appendix.

Innovative practices are highest in retail firms followed by manufacturing and services. Industry segregation shows high differences, the lowest levels of innovative products are in the services and retail sectors followed by motor vehicles and the chemical industry. Innovation by the provision of training is lowest in textile, chemicals, and garments industries respectively.

Table 1: Descriptive statistics of firm's level selected variables

Variable Description	Percentage
Firms that have recently added new assets	20%
Firms facing obstacles to access new production technology	62%
Firms located in some main business city	81%
Firms practicing innovative managerial practices	17%
Firms practicing innovative/improved production	30%
Firms working independently	93%
Medium Firms	33%
Small Firms	45%
Firms working as subsidiary of a big firm	7%

Source: Author's calculation

The table shows firms' characteristics: many face tech adoption hurdles, most are in main cities, mainly independent, with some innovative production, but fewer in managerial practices.
Moreover, data suggests that more than eighty percent of small and medium firms do not export their products. Also, the non-exporting firms are approximately half likely to produce innovative products as exporting firms. Firms are more likely to innovate if they have a competitive business environment; however, if the competition gets more intense innovation is relatively less may be due to homogenous products in the perfect competition environment.

Results and Discussions

Results of the binary Probit model indicate a number of characteristics of the firms are relevant to explaining innovation practices of firms by introducing some new product or service provision. Results are given in Table 1. Industrial background, improved managerial and organizational practices, time of establishing the business, direct exports, competitive business environment, and use of foreign-made technology in production process significant to promote innovation.

[2]Table 2. Innovation model: Determinants of innovation (Model I), technical and learning innovation (Model I, II a and IIb)

[3]Innovation	I	II a	II b
Nature of Firm	0.091***	0.017	0.011
Assets	0.101	0.450***	0.194
IOMP	0.976***	1.046***	0.548***
Subsidiary	-0.239	-0.317	0.606**
Age	0.014***	-0.0001	-0.0004
dFirm Size1	0.323	4.983***	0.542
dFirm Size2	0.515	5.492***	0.806
Type of Locality	0.380**	0.166	0.610***
Skilled Employees	0.0003	-0.00008	0.0004
Direct Exports	0.0013***	-0.0015	0.002
Competition	-0.0003***	-0.0002	-0.0002

[2] Provinces should be considered as Province 1= Punjab, Province 2= Sindh, Province 3= KP Province 4= Baluchistan
[3] Description of variables is given in appendix. Please see able 1 A

Foreign medtech	0.401**	0.434**	0.992
APTech	-0.605	-0.140	-0.132
dProvince1	0.747***	1.025**	-0.798***
dProvince2	0.174	1.205**	-0.343
dProvince3	-0.303	0.770	-0.543**
dProvince4	0.115	1.730***	-0.496
Constant	-2.456***	-7.916***	-1.966***
Wald (χ^2)	134.52***	351.36***	93.40***
Observations	606	606	606

Source: Authors' calculations

Coefficients are significant using robust standard errors at significance level, * 1%, ** 5% and *10%. P value is used for predicted probability.**

Innovative practices are significantly relevant in the province of Punjab while these are not for firms in other provinces. It has been observed that innovative organizational and management practices positively support the innovation of small and medium firms. The number of skilled employees and the firm's access to foreign markets for exports also help to experience greater innovation in the firms. Moreover, it is observed that exporting firms are found practicing more innovations than the firms that produce goods for the home market this may be the due preference for novelty by foreign consumers.

Table 3. Innovation model 2: innovation model: Determinants of firm's productivity by technical and learning innovation (Model I and II)

[4]**Productivity**	I	II
P learning Innovation	--	3.95
P Innovation	-26.55	
P Tech Innovation	--	-35.57
Province1	-2.57	-4.38
Province2	-2.91	-0.114
Province 3	-3.82	-0.102
Province 4	-7.13	1.053
firm type	0.325	-0.225
Assets	2.89	4.93**
IOMP	-0.655	-0.07
Subsidiary	4.76	4.76
Age	-0.008	-0.117**
dFirm size1	0.887	1.29
dFirm size2	6.081	8.003
City type	-3.23	-5.41**
Skilled Employees	0.005	0.0039
Exports	0.102	0.076
Competition	-0.0008	0.0007
Foreign medtech	11.604	10.8001**
Prod tech access	-0.843	2.957
Constant	77.104	76.48

[4] Description of variables is given in appendix. Please see able 1 A

F Statistics	3.83***	3.84***
Observations	606	606

Source: Authors' calculations

Coefficients are significant using robust standard errors at significance level, *** 1%, ** 5% and *10%. P value is used for predicted probability.

Enterprise age is found to have a negative yet insignificant effect on firms to innovate in techniques of production. This suggests the there is need to change the hierarchal structure in old, aged firms. The use of foreign-made technology is very important for technology-based innovation by firms. However, this is not significant for learning innovation by the employees of the firm. These results are consistent with theory as skill-based technology requires appropriate training of employees and mere access to technology cannot ensure it. Firms' assets are significant for technological innovation as it needs to install high technology embedded machines, software, and other equipment. Therefore, firms with less asset holding may focus to improve their output through innovation by skills development. This analysis is partly consistent with the mainstream literature on developing countries' evidence.

Predicted values of innovation are used to estimate the effect of innovation on firms' productivity which is measured through capacity utilization. Innovation through skill development is positively affecting a firm's capacity utilization which in turn affects the firm's productivity and growth. Firms' productivity is also enhanced if the firm is located in some business city and has an old establishment. The negative coefficient of innovation and production technology-based innovation suggests that existing productive capacity of firms may not remain compatible with use of the latest technology. Thus, it is necessary to enhance the capacity according to technology for more growth. Moreover, it has been also observed that firm size, and formality hardly effect firms' productivity which is consistent with the literature that these factors are not constraint to firm's growth. That is small firms do have the same potential to grow and practice innovations. Moreover, results also show that 'learning by doing' and 'schooling' are the important factors in firms' capacity utilization.

The low efficiency of the firms is significantly related to the poor organizational and management arrangements. Somehow, we have also observed that firms perform better which are located in large cities as they get more chances to participate in knowledge-based practices. Results for provinces are different for certain variables. This is due to the prevalence of different business environments and opportunities across provinces. Competition in the market is found as a driving force for firms to innovate for capacity utilization in all regions.

Conclusion and Recommendations

This research is conducted to identify the factors for the productivity growth of firms in Pakistan by their innovative practices. SMEs have a great potential to attain the welfare of the economy at all levels. Productivity is found to be significantly affected by innovations in output and manufacturing processes. This result is consistent with the and on SMEs growth (Arshad and Arshad, 2019) and (Harvie, 2019) on SMEs growth. There is a need to focus on the strategies that bring innovation to Pakistan's SME sector across industries. It is also found that knowledge development and procedural improvements are essential to ensure the production of novel products and firm growth same is evident from (Santoro et al., 2018). These are estimated in a two-fold model one is the probability model for innovation and the other is the effect of innovation on a firm's productivity. Our results support the need to have higher productivity through better organizational structure, employees training, and transformation of the internal structure of the production process, exports growth, and development of the business environment in various location.

Recent developments and trends in business practices suggest that technology-embedded

differentiated products must be produced and promoted. This strategy is more profit and growth-oriented for two reasons, increases in output by improved procedures and prospects of growth in bringing sustainability to firms in local and foreign markets. Given the acute challenges of socio-economic and political issues along with the lack of business environment in Pakistan (Khawaja and Iqbal, 2019) this study recommends important implications for policy purposes. Export-oriented policies, research, and development for SMEs, training provisions for managers and employees, and changes in the hierarchal structure of the old established enterprises are the key features for SMEs' growth. It is suggested to promote positive competition among SMEs as it works as a driving force to bring innovation and enhance capacity utilization of the firms.

Besides focusing on export-led growth of firms' home demand-based growth shouldn't be ignored as we have found that non-exporting firms are not more inclined towards innovation, they must be encouraged to grow at the par of exporting firms by imitating their growth strategies. Innovation directly brings firms growth and has the potential to indirectly improve the livelihood and socio-economic status of the associated employees. Further, the informal sector may catch up with the formal sector in innovation and growth.

Limitations

This study has not analysed the factors affecting firms taking up innovative practices and procedures in-depth due to data limitations. The informal firms are also not included in evaluation due to non-availability of data. However, it is important to analyse informal sector in context of Pakistan as majority of the firms are working informally in the country. But given the limitations of the data availability the results of this research may not be sufficient for generalization to informal firms. Hence, it is recommended to conduct primary surveys for improved data collection of undocumented small businesses as the results are expected to provide important insights.

Conflict of Interest Statement

There is no actual or potential conflict of interest in relation to this article.

References

Arrow, K. J. (1971) The economic implications of learning by doing. In *Readings in the Theory of Growth* (pp. 131-149). Palgrave Macmillan, London.

Arshad, M. and Arshad, D. (2019). Internal capabilities and SMEs performance: A case of textile industry in Pakistan. *Management Science Letters, 9* (4), 621–628.

Atuahene-Gima, K. and Evangelista, F. (2000). Cross-functional influence in new product development: An Exploratory Study of Marketing and R… D Perspectives. *Management Science*, *46*(10), 1269–1284.

Balassa, B. (1985). Exports, policy choices, and economic growth in developing countries after the 1973 oil shock. *Journal of Development Economics*, *18*(1), 23–35.

Barrios, A., Reficco, E. and Taborda, R. (2019) 'Training effects on subsistence entrepreneurs' hope and goal attainment', *Education and Training, 61*(7/8), 895-917.

Bell, M. and Pavitt, K. (1992). Accumulating technological capability in developing countries. *The World Bank Economic Review*, *6*(suppl_1), 257–281.

Bhatti, Y. A. and Ventresca, M. (2012). *The Emerging Market for Frugal Innovation: Fad, Fashion, or Fit?*, *SSRN*.

Bigsten, A. and Gebreeyesus, M. (2009). Firm productivity and exports: Evidence from Ethiopian manufacturing. *The Journal of Development Studie*s, *45*(10), 1594-1614.

Boyan, J. (1982). Selection and the Evolution of Industry. *Econometrica*, *50*(3), 649–670.

Carpenter, R. E. and Petersen, B. C. (2002). Is the Growth of Small Firms Constrained by Internal Finance?. *The Review of Economics and Statistics, 84*(2), 298–309.

Chataway, J., Hanlin, R. and Kaplinsky, R. (2014). Inclusive innovation : an architecture for

policy development. *Innovation and Development, 4*(1), 33-54.
Coccio, M. (2018). The origin of Economics of Innovation. *Journal of Economic and Social Thought, 5*(1), 9–28.
Crépon, B., Duguet, E. and Mairessec, J. (1998). Research, Innovation And Productivity: An Econometric Analysis At The Firm Level. *Economics of Innovation and new Technology, 7*(2), 115–158.
Crespi, G. and Zuniga, P. (2012). Innovation and productivity: evidence from six Latin American countries. *World Development, 40*(2), 273–290.
Dooley, L., Kenny, B. and O'Sullivan, D. (2017). Innovation capability development: case studies of small enterprises in the LMT manufacturing sector. *Small Enterprise Research, 24*(3), 233–256.
Dosi, G., Grazzi, M. and Mathew, N. (2017). The cost-quantity relations and the diverse patterns of "learning by doing": Evidence from India. *Research Policy, 46*(10), 1873-1886.
Ellery, R. and Sala, S. E. B. (1999). Learning-by-Doing and Schooling. *Instituto de Pesquisa em Economia Aplicada–IPEA.*
Fagerberg, J., Srholec, M. and Verspagen, B. (2009). *Innovation and economic development*. U*NU-MERIT* (Vol. 32). Working paper series.
Forsman, H. (2011). Innovation capacity and innovation development in small enterprises. A comparison between the manufacturing and service sectors. *Research Policy, 40*(5), 739–750.
Fu, X., Mohnen, P. and Zanello, G. (2018). Innovation and productivity in formal and informal firms in Ghana. *Technological Forecasting and Social Change, 131,* 315–325.
Goedhuys, M., Janz, N. and Mohnen, P. (2008). What drives productivity in Tanzanian manufacturing firms: technology or business environment?. *The European Journal of Development Research, 20*(2), 199-218.
Goedhuys, M., Janz, N. and Mohnen, P. (2013). Knowledge-based productivity in "low-tech" industries: evidence from firms in developing countries. *Industrial and Corporate Change, 23*(1), 1-23.
Grossman, G. M. and Helpman, E. (1991). *Innovation and growth in the global economy.* MIT press.
Hall, B. H., Lotti, F. and Mairesse, J. (2009). Innovation and productivity in SMEs: empirical evidence for Italy. *Small Business Economics, 33*(1), 13-33.
Harvie, C. (2019). Enterprises (MSMEs): Challenges , Opportunities and Sustainability in East Asia, in *Trade Logistics in Landlocked and Resource Cursed Asian Countries* (pp. 155-174). Palgrave Macmillan, Singapore.
Hungund, S. and Mani, V. (2019). Benchmarking of factors influencing adoption of innovation in software product SMEs: An empirical evidence from India. *Benchmarking: An International Journal, 26*(5), 1451-1468.
Hurley, R. F. and Hult, G. T. M. (1998). Innovation, Market Orientation, and Organizational Learning: An Integration and Empirical Examination. *Journal of Marketing, 62*(3), 42-54.
Janz, N., Lööf, H. and Peters, B. (2003). *Firm Level Innovation and Productivity- Is there a Common Story Across Countries?*.
Khawaja, I. and Iqbal, N. (2019). *Determinants of Expansion of Micro and Small Firms and State of Entrepreneurship in Pakistan* (No. 2019:160). Pakistan Institute of Development Economics.
Klepper, S. (1996). Entry, exit, growth, and innovation over the product life cycle. *Amrican Economic Review, 86*(3). 562–583.
Lall, S. (1992). Technological capabilities and industrialization. *World Development, 20*(2), 165-186.
Lee, C. and Narjoko, D. (2015). Escaping the Middle-Income Trap in Southeast Asia: Micro Evidence on Innovation, Productivity, and Globalization. *Asian Economic Policy Review, 10*(1), 124–147.

Lengnick-Hall, C. A. (1992). Innovation and competitive advantage: What we know and what we need to learn. *Journal of management*, *18*(2), 399-429.

Li, Y. and Rama, M. (2015). Firm Dynamics, Productivity Growth, and Job Creation in Developing Countries: The Role of Micro-and Small Enterprises. *The World Bank Research Observer*, *30*(1), 3-38.

Lucas Jr., R. E. (1988). On the mechanics of economic development. *Journal of Monetary Economics*, *22*(1), 3–4.

Lundvall, B. Å. ed (2010). National systems of innovation: Toward a theory of innovation and interactive learning. *The learning economy and the economics of hope*, *85*.

Mairesse, J. and Mohnen, P. (2010). Using innovation surveys for econometric analysis. In *Handbook of the Economics of Innovation* (Vol. 2, pp. 1129-1155). North-Holland.

Mano, Y., Iddrisu, A., Yoshino, Y., & Sonobe, T. (2012). How can micro and small enterprises in Sub-Saharan Africa become more productive? The impacts of experimental basic managerial training. *World Development*, *40*(3), 458-468.

Masood Ul, H., Iqbal, Z. and Malik, M. (2018). Exploring the role of technological developments and open innovation in the survival of SMEs : an empirical study of Pakistan. *Int. J. Business Forecasting and Marketing Intelligence*, *4*(1), 64–85.

McCartney, B. (2011). *Developing a Sustainable SME Banking Franchise in Pakistan: Best Practices and Policy Insights.*

No Kieser, A. and Koch, U. (2008). Bounded rationality and organizational learning based on rule changes. *Management Learning*. *39*(3), 329-347.

Norling, N. and Swanström, N. (2007). The Shanghai Cooperation Organization, trade, and the roles of Iran, India and Pakistan. *Central Asian Survey*, *26*(3), 429–444.

OECD (2005). Oslo manual. *Paris and Luxembourg: OECD/Euro-stat, na dan*, *19*, 2021.

Ophem, H. V., Brouwer, E., Kleinknecht, A., & Mohnen, P. (2002). The mutual relation between patents and R&D. In *Innovation and firm performance* (pp. 56-70). Palgrave Macmillan, London.

Pešalj, B., Pavlov, A., & Micheli, P. (2018). The use of management control and performance measurement systems in SMEs: A levers of control perspective. *International Journal of Operations & Production Management*, *38*(11), 2169-2191.

Raza, S., Minai, M. S., Zain, A. Y. M., Tariq, T. A., & Khuwaja, F. M. (2018). Dissection of small businesses in pakistan: issues and directions. *International Journal of Entrepreneurship*, *22*(4), 1–13.

Robson, P. J., Haugh, H. M. and Obeng, B. A. (2009). Entrepreneurship and innovation in Ghana: enterprising Africa. *Small Business Economics*, *32*(3), 331–350.

Romer, D. and Chow, C. (1996). *Advanced Macroeconomic Theory*. Mcgraw-hill.

Romer, P. M. (1990). Endogenous technological change, *Journal of political Economy*, *98*(5, Part 2), S71–S102.

Santoro, G., Ferraris, A., Giacosa, E., & Giovando, G. (2018). How SMEs Engage in Open Innovation: a Survey. *Journal of the Knowledge Economy*, *9*(2), 561–574.

Saulina, M. (2016). Performance measurement approach for innovation capability in SMEs. *International Journal of Productivity and Performance Management*, *65*(2), 162-176.

Schumpeter, J. A. (1982). The theory of economic development: An inquiry into profits, capital, credit, interest, and the business cycle (1912/1934). *Transaction Publishers.–1982.–January*, *1*, 244.

Sissoko, M., & Castiaux, A. (2018). How does frugal innovation emerge and lead to sustainability in developing countries. *A case study in Malian agricultural areas. How does frugal innovation emerge and lead to sustainability in developing countries*, 1-22.

Subhan, Q. A., Mahmood, T. and Sattar, A. (2014). Innovation and economic development: A Case of Small and Medium Enterprises in Pakistan. *Pakistan Economic and Social Review*, *52*(2), 159–174.

Terziovski, M. (2010). Innovation practice and its performance implications in small and medium

enterprises (SMEs) in the manufacturing sector: a resource-based view. *Strategic Management Journal*, *31*(8),.892-902.

Thornhill, S. (2006). Knowledge, innovation and firm performance in high-and low-technology regimes. *Journal of business venturing. 21*(5), 687–703.

Zanello, G., Fu, X., Mohnen, P., & Ventresca, M. (2016). The creation and diffusion of innovation in developing countries: A systematic literature review. *Journal of Economic Surveys*, *30*(5), 884-912

Annexure

Table 1A. Description of variables

DV	IV	Definition
Innovation Practices by the firms	Firm Type	If firm is manufacturing , service oriented or retailer
	Assets	If firm has purchased new assets in last fiscal year
	IOMP	If firm has employed Improved organizational and managerial practices
	Subsidiary	If firm is a subsidiary of a big Firm
	Age	Total year of establishment of the firm
	Type of Locality	If firm is located in business city
	Skilled employees	How many of the employees are skilled
	Direct Exports	If firm making exports goods
	Competition	How many competitor firm faces
	Foreign medtech	If firm is utilizing foreign made technology other than software
	Aptech	Access to production technology
Productivity	P learning Innovation	Predicted values of learning
	P Innovation	Predicted value of Innovation
	P Tech Innovation	Predicted Technical Innovation
	Formality	If firm is formally registered
	Learning	If firm has conducted training sessions for improvement of skills by workers
	Techniques	If firm has employed latest techniques in production process