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TRIPLE HELIX MODEL AND FIRM PERFORMANCE: A CASE OF PAKISTANI SMES

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Abstract

Small and medium enterprises (SMEs) in developing countries are striving to achieve better performance. Several external agents play their role by helping firms to achieve improved performance by implementing innovation in the firm. In this stance, the present study aims to investigate the role government, university, and industry play in achieving the enhanced firm performance. The study considered marketing innovation and organizational innovation as the pillars of the firm's performance. The study hypothesized that the players of triple helix model (government, industry, and university) have direct influence on the organizational and marketing innovation of the firm which further helps in achieving better firm performance. The research collected the data from the SMEs of Pakistan from different sectors and major cities. The study evaluates the data through structural equation modeling the results of the study reveal the significant relationship of all variables. The results of the study unveiled that external sources like government, universities and industries helped the organizations to improve their performance by collaborating with them. The study highlighted that Pakistani SMEs are lacking behind in bringing innovation in their organizational and marketing activities due to lack of resources, support, and proper R&D. On the ground of the findings the study concluded that SMEs in Pakistan could enhance their performance by collaborating with the agents of triple helix model.

Keywords: *Triple helix model, marketing innovation, organization innovation, firm performance, SMEs of Pakistan.*

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1. INTRODUCTION

Small and medium-sized businesses (SMEs) are becoming one of the most significant economic factors in today's globalized economy, particularly in emerging economies (Songling et al., 2018). Small and medium-sized enterprises (SMEs) make up 90% of the business sector in SMEs in developing nations like Pakistan continue to struggle with having sustainable firm performance that would improve their volume (Ueasangkomsate & Jangkot, 2019). In the aforementioned vein, the study by (Tahir et al., 2016) highlighted that SMEs in underdeveloped nations typically rely solely on internal resources and do not take use of external benefits, which puts them at risk for criticism. Businesses face obstacles to innovation in a turbulent market because they lack effective R&D, funding, and up-to-date expertise (Ueasangkomsate & Jangkot, 2019). In order to seize creative possibilities and improve company performance, businesses in emerging economies are encouraged to build advantageous relationships with both financial and nonfinancial institutions (Songling et al., 2018).

The theoretical framework of collaboration for innovation between businesses and outside actors has been built on the Triple Helix model, which is presented by Etzkowitz and Leydesdorff (Etzkowitz & Leydesdorff, 1995). The engagement of three important players - academia, industry, and governments - plays a critical role in the description of innovation. According to (Hernández-Trasobares & Murillo-Luna, 2020), these agents' interaction allows for the interchange of resources, talents, and know-how and creates synergies that encourage innovation. Given the dearth of empirical studies, (Pereira et al., 2020) suggest doing future research on corporate innovation from an integrated viewpoint with input from several groups. The Triple Helix theoretical method of Etzkowitz and Leydesdorff (Dzisah & Etzkowitz, 2008) can be beneficial for pursuing this line of inquiry in this situation. This method emphasizes how crucial it is for different important players—public and private—to work together for the growth of innovation systems. The synergistic impact of working with the Triple Helix agents on corporate innovation in general is supported by empirical data from authors like (Hernández-Trasobares & Murillo-Luna, 2020). The goal of academic research is to better understand the features of academic spin-offs and the processes that lead to their formation of new ideas for innovation (Gunday et al., 2011) . In this stream (Alkahtani et al., 2020) suggested that SMEs in Pakistan could have better firm performance from strong networking with these entities by capturing new ideas, opportunities and innovation.

However, limited research has been done to analyze how an article in the field of education intended to create new projects based on the results of its scientific research (Feola et al., 2019; Prodan & Drnovsek, 2010). Literary reviews show that various studies have been conducted to understand the role of government, industry and academia in bringing innovation (Clarysse et al., 2011; Meoli & Vismara, 2016). Investigating the Triple Helix Model in the Pakistani SME context adds a novel dimension, acknowledging the distinctive socio-economic factors influencing collaboration between academia, industry, and government. The study offers fresh insights into how the Triple Helix Model operates in an emerging economy, addressing gaps in the literature and contributing to a more comprehensive understanding of

its application. By specifically examining firm performance in Pakistani SMEs, the research provides actionable findings, potentially offering practical strategies for stakeholders to enhance collaboration and improve overall business outcomes. Despite a wealth of literature on innovation intent, only a few studies include the role of government, industry, and academia for generating new ideas. Based on a call from (Ueasangkomsate & Jangkot, 2019), to reconsider the theoretical and experimental models of the educational business, and suggestions (Feola et al., 2019) to understand the triple helix in a variety of cultural contexts. The effect on SMEs THM components were included in this analysis so that the three helixes of THM may be utilized to boost up firm's performance from a developing country's perspective. To solve this problem, a study of THM in developing countries such as Pakistan might have a significant influence on the development of a platform for SMEs to comprehend and assess the commercialization of ideas created by the integration and collaboration of government, academia and industry.

2.THEORETICAL BACKGROUND AND HYPOTHESIS DEVELOPMENT

2.1. Triple Helix Model (THM)

THM has been frequently employed in business research studies to understand the process of business-based innovation (Etzkowitz et al., 2007; Fidanoski et al., 2022). THM provides the foundation for establishing innovative collaborations between government, business, and academia. In the age of the knowledge-based economy, the model is characterized as a collaborative partnership between research institutions, industry, and government to foster innovation (orghi, Anna M et al., 2018).

Innovative startups, according to THM, require government assistance at several levels. The government, in particular, is a central entity that establishes rules and regulations for the conduct of economic activity. Similarly, the government's participation involves monetary incentives as well as physical representation via incubators and research parks (Fini et al., 2009).

Second, educational institutions must advocate policies and resources that will help students succeed (Ueasangkomsate & Jangkot, 2019). In terms of beneficiaries and dynamic resources, it has been noted that university collaboration techniques differ substantially (Fini et al., 2009).

Third, industry and finance, or more broadly institutions working in a commercial setting, can supply critical resources for academic spin-off growth and development (Fini et al., 2009; Shi et al., 2023). According to studies, venture capital is beneficial to the formation of R&D and the number of patents (Zailani et al., 2012), the professionalization of startups and access to resources and competences (Shea et al., 2014). Similarly, in addition to money, the influence of local industry can encourage the formation of innovation (Saeed et al., 2015). THM serve as the platform for the R&D to create innovative ideas and these ideas work as phenomenon permanent change in the firm and society (Natário et al., 2012).

2.2. SMEs Collaboration with Universities

Universities and other research institutions offer formal R&D collaboration, technology transfer, customized training in relation to skilled workers, and innovative knowledge to businesses (Zeng et al., 2010). After conducting a meta-review, (Etzkowitz & Leydesdorff, 2000; Messeni Petruzzelli & Murgia, 2023), came to the conclusion that universities would profit from collaborating with Triple Helix Agents to advance the role of universities as the primary source of innovation. (Belderbos, R., Carree, M., Diederen, B., Lokshin, B., & Veugelers, 2004) determined that the best approach to achieve innovation was through cooperation with academic institutions in Netherlands. Cooperation with higher education and public research organizations has been identified as a key foundation for new knowledge for SMEs in developing nations which provides the market's trends through effective communication and R&D which help the SMEs in bringing innovation in several departments (Liefner et al., 2006). . In order to spur innovation, (Dzisah & Etzkowitz, 2008)noted how several institutions had engaged in knowledge transfer with Brazilian incubators and development to innovate the organizational practices and marketing strategies.

Cooperation with universities enhances SMEs' success in terms of innovation, according to (Zeng et al., 2010). According to (Audretsch, 2014), when a firm needed a source of cutting-edge technological expertise for innovation, university partners were more likely to be selected. A university business incubator's program is one of the main policy strategies for fostering innovation, according to (Wonglimpiyarat, 2016).

Based on these arguments current research hypothesized that:

H1: collaboration of SMEs with the academia has positive influence on firm's organizational innovation.
H2: collaboration of SMEs with academia has positive influence on firm's marketing innovation.

2.3 Collaboration of SMEs with Industry

The term "industry" describes a group of businesses engaged in similar market-driven activities (Erosa, 2012). Collaboration is necessary for businesses to access sources of expertise, novel technologies, and/or underdeveloped markets within their industrial sector (Fischer & Varga, 2002). (Crespi & Zuniga, 2012) discovered that information sharing through company collaboration had favorable benefits on organizations' innovation performance in six Latin American countries, which is relevant to rising economies. (Sammarra & Biggiero, 2008) argued that collaboration among Italian businesses operating in the same sector could boost innovation. Additionally, (Chung & Kim, 2003) argued that in the Korean sector, collaboration between suppliers and manufacturers allowed businesses to improve product quality. (Nieto & Santamaría, 2007)highlighted how industrial suppliers could be useful sources of knowledge for creating the goods of Spanish manufacturing.

The terms competitive edge and value chain develop in this sense, with the former referring to the competencies and skills that the firm excels in relative to its competitors in the market and/or to the have long-term relations with their suppliers, vendors or other firms in the industry (Compagnucci & Spigarelli, 2018). According to (Klomklieng et al., 2012), inter-firm connections can boost innovation by identifying shared requirements and prototyping through equipment sharing, information and knowledge exchange, product/process development, and consultation services. According to (Landström et al., 2015), companies who partner with other innovative businesses perform better when it comes to innovation. The two hypothesis that arise from this debate are:

H3: collaboration of SMEs with industry has positive influence on organizational innovation.
H4: collaboration of SMEs with industry has positive influence on marketing innovation. 2.4.

2.4. Collaboration of SMEs with Government

Government might play a part in encouraging increased cooperation between businesses and colleges (Freel, 2000). The SME sector is supported by governments in a variety of ways, including tax breaks, loans, social assistance, and financial support to date (Alkahtani et al., 2020). According to (Hewitt-Dundas, 2006), the Irish government had implemented governmental steps to encourage small businesses as sources of innovation. According to (Rawindaran et al., 2023; Smallbone et al., 2003) research, the Irish government had introduced a number of Programs encouraging SMEs to guarantee organizational and technological improvements. (Biggs & Shah, 2006) discovered a connection between the effectiveness of informal local government officials and innovation for African SMEs. It has been asserted that things like credit, training, services, loans, paying taxes, etc. cannot improve organizational performance, but in reality they play a crucial role in achieving sustainable performance (Alkahtani et al., 2020). In addition, the government has supported legislation, Programs, resources, and initiatives for joint ventures between Belgian universities and businesses. (Guerrero & Urbano, 2017) discovered that the Triple Helix strategy allowed Mexican SMEs to gain access to information, technology, money, and government support. Government monetary benefits in particular are thought to be a key driver of innovation in both developing and developed nations (Alkahtani et al., 2020).

Therefore, present study hypothesized that.
H5: Collaboration of SMEs with government has positive influence on organizational innovation.
H6: Collaboration of SMEs with government has positive influence on marketing innovation.

2.5. Organizational Innovation

Organizational innovation has been consistently defined as the adoption of an idea or behavior that is new to the organization (Hage, 1999). According to

(Walker, 2011), organizational innovation improves a company's success through enhancing work quality, information sharing, learning capacity, including the use of newly developed technologies. (Gunday et al., 2011) founds that innovation have positive significant relationship with the better performance of the firm as it gives the firm sustainable competitive edge with implementation of new ideas, practices, technology etc. Employee flexibility would increase with the adoption of a new decentralized organizational paradigm, resulting in higher job satisfaction and output (Tuan et al., 2016). The firm will be able to concentrate on what it does best by using a new organizational structure in its external relations, which will delegate other activities to partners who can carry them out more affordably and/or successfully (Phan, 2019). In reality, according to (OECD/Eurostat, 2005), organizational innovation can boost performance and productivity at work and/or lower administrative and transaction costs, both of which can boost company's performance. Thus, on the basis of these argument current research hypothesized that:

H7: Organizational innovation has positive influence on firm's performance.

2.6. Marketing Innovation

A company's capacity to approach the market, utilize the communication channels efficiently, and provide goods and services in order to attract new or existing clients is referred to as marketing innovation (Atalay et al., 2013). It has a close connection to business operations involving product commercialization. Although innovation activities offer more benefits to customers than existing products with a fundamentally different core technology (Purchase & Volery, 2020), they can also create considerable uncertainty for businesses and consumers that could negatively influence the product's success (Lee et al., 2019). With marketing innovation, it is possible to reverse the relatively lower returns from incremental products that are due to potentially perceived marginal consumer benefits (Taylor & Todd, 1995) and failure to establish a competitive position due to the possibility of imitation and a loss of price advantage (Lee et al., 2019). By giving buyers the impression that a new product is innovative, marketing innovation can make incremental items more competitive (Hassan et al., 2013).

For instance, (Purchase & Volery, 2020; Taylor & Todd, 1995) discovered that marketing innovation activity helps manufacturing firms gain competitive advantages including product differentiation and cost leadership in the market. Therefore, current research assumes on the basis of previous studies arguments that:

H8: Marketing innovation has a positive influence on firm's performance.

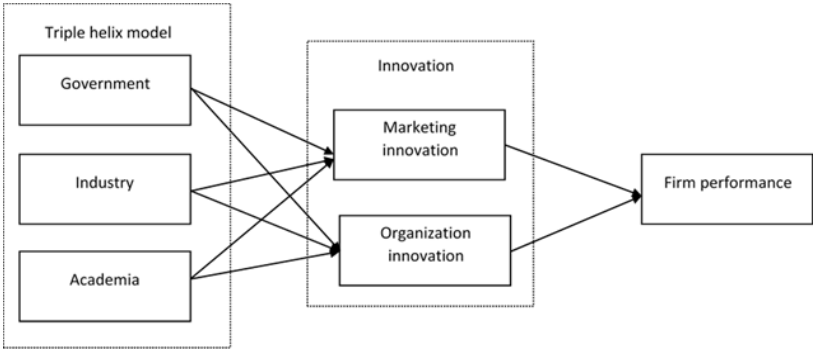

Figure 1 Proposed research model.

3.MATERIALS AND METHODS

3.1. Measures

Using a standardized questionnaire divided into two portions, the study gathered data. The first component of the questionnaire asks questions about the respondent's demographics, while the second section asks questions about constructs. This study altered measures from prior research in the same context for content validity. The study adapted the 5 item scale of university collaboration, 5 items scale of industry collaboration and 5 items scale of government collaboration from study of (Ueasangkomsate & Jangkot, 2019). 5 items scale of marketing innovation is adapted from (Gunday et al., 2011), 5 items scale of firm performance is adapted from (Lii & Kuo, 2016), 9 items scale of organizational innovation is adapted from (Tuan et al., 2016). Moreover the study use the 7 point-Likert scale which is recommended by previous studies (Finstad, 2010; Presser et al., 2004).

3.2.Sampling and Data Collection

The SMEs of Pakistan were selected as the study's targeted audience for the purposes of data collection, and the simple random sampling method was endorsed for the collection of data from the targeted samples from two large industrial cities, Faisalabad, and Sialkot, as well as four provincial capitals. The simple random sample approach is suitable for analyzing how factors interact behaviorally (Newsted et al., 1998). Because the respondent's accessibility varies, convenience sampling was employed to determine the sample size because it was appropriate for the situation (Saunders et al., 2016). The authors approaches the respondents through an online survey and received 400 responses out of which 308 responses were selected for further analysis after eliminating bias responses.

3.3.Common Method Variance (CMV)

The CMV phenomenon is caused by the measurement model's ambiguity in

determining how to evaluate the causes and effects relationship. The CMV usually happens when information is collected simultaneously from a single source. It is critical to comprehend the CMV since it might affect the study's validity before starting the primary analysis. The most common and well-liked method for calculating CMB in social research is the Harman's single component test (P. M. Podsakoff, S. B. MacKenzie, 2012). As a result, this study also employed Harman's single component test using SPSS to calculate the CMV (V25).

Data of present research is collected from single source therefore the CMV was evaluated by Harman's single factor by exploratory factor analysis EFA through SPSS. The study categories the items into 6 groups and the results showed that the first factor explains 39.24% variance which is under the threshold therefore there is no critical issue of the CMV (Riaz et al., 2021).

3.4.Demographical Results

Information about the demographics of the respondents is presented in table 1. The demographical results present that 68% respondents were male, and the rest was females. Further it shows that the majority of the respondents are highly educated and under the age of 30 to 50.

Table 1 Demographical information

Category		Frequency	Percentage
Gender	Male	209	68.0
	Female	99	32.0
	Total	308	100.0
Age	18-29	30	9.7
	30-39	105	34.1
	40-50	129	41.9
	Above 50	44	14.3
	Total	308	100.0
Education	Undergraduate	004	1.3
	Graduate	159	51.6
	Postgraduate	142	46.1
	Other (Diploma/ professional education)	003	1.0
	Total	308	100.0

3.5. MEASUREMENT MODEL RESULTS

3.5.1 Confirmatory factor analysis

To examine the validity and consistency of the variables of the proposed research framework the study conducted the confirmatory factor analysis (CFA) through AMOS. The findings of the study revealed that the values of CMIN/DF, 1.393: CFI, 0.989: RMSEA, 0.031: PClose.1.000. All the values of CFA are under the threshold which shows that the model fitness is good.

3.5.2 Convergent validity and reliability

Convergent reliability and validity were first investigated in the current investigation. The correlation level of numerous indicators in related structured studies is measured through convergent validity (Sarstedt et al., 2014). The results of factor loadings, composite reliability, Cronbach's alpha, and average variance extracted (AVE) were shown in Table 2.

The values of Cronbach's alpha range from .852 to .967, values of CR range from .849 to .971 and the values of AVE are ranged from .686 to .892. The results revealed that all the values are under the acceptance range therefore there is no issue of the convergent validity and reliability (Fornell & Larcker, 1981).

Table 2 Convergent validity and reliability

Variables	Items	Loadings	Cronbach's alpha	CR	AVE
University Collaboration	UC1	.738	.921	.915	.689
	UC2	.768			
	UC3	.847			
	UC4	.856			
	UC5	.850			
Industry Collaboration	IC1	.824	.915	.916	.785
	IC2	.765			
	IC3	.743			
	IC4	.801			
	IC5	.795			

Government Collaboration	GC1	.841	.967	.971	.892
	GC2	.818			
	GC3	.852			
	GC4	.872			
	GC5	.871			
Marketing Innovation	MI1	.770	.917	.916	.686
	MI2	.780			
	MI3	.810			
	MI4	.773			
	MI5	.764			
Organizational Innovation	OI1	.769	.852	.849	.712
	OI2	.747			
	OI3	.748			
	OI4	.822			
	OI5	.719			
	OI6	.886			
	OI7	.723			
	OI8	.878			
	OI9	.811			
Firm Performance	FP1	.770	.884	.885	.719
	FP2	.797			
	FP3	.814			
	FP4	.802			
	FP5	.799			

3.5.3 Discriminant validity

Additionally, the present study looked at discriminant validity, which displays the amount of empirical variation among the study's constructs (Sarstedt et al., 2014; Shahbaz et al., 2019). To assess the discriminant validity, correlation between variables and the square root of the AVE are utilized (Hu & Bentler, 1999). Table 3 shows the square root of the AVE and association matrix, demonstrating the accuracy of discriminant validity (Shahbaz et al., 2020).

Table 3 Square root of the AVE and association matrix

	UC	MI	GC	OI	FP	IC
UC	0.830					
MI	0.449***	0.828				
GC	0.373***	0.582***	0.944			
OI	0.369***	0.463***	0.361***	0.844		
FP	0.413***	0.535***	0.514***	0.514***	0.848	
IC	0.462	0.563	0.601	0.409	0.558	0.886

3.6 Structural model analysis

After confirming the accurate results of the measurement model the study further examined the structural model analysis which was done through AMOS.

3.6.1 Hypothesis analysis

The study conducted path analysis for hypothesis testing via AMOS. Model fitness was checked at first. The findings of the model fitness show that CMIN/DF= 1.488, PCLOSE= 0.829, RMESA= 0.028, and CFI= 1.000 which is a good model fitness. The results of SEM show that the relationship of UC with MI is (β=.219, P=.000), UC with OI (β=.260, P=.000) IC with MI (β=.230, P=.000) IC with OI (β=.312, P=.000) GC with MI (β=.328, P= .000), GC with OI (β=.301, P=.000) are significantly associated. Moreover MI (β=.223, P=.000) and OI (β=.456, P=.000) are also significant predictors of firm performance which show that the H1, H2, H3, H4, and H5 are accepted.

4.DISCUSSION

A collaboration of THM agents with the SMEs was under discussion area where scholars and practitioners were striving to get know the role of different players in enhancing the firm's performance. By fusing aspects from academia, business, and government to create a new organizational and institutional framework for the creation, transmission, and use of knowledge, the THM is an ideal catalyst for innovation and economic development in Pakistan. This view includes both the creative renewal that emerges within each of the three institutional domains of university, industry, and government as well as at their intersections, in addition to the creative destruction that emerges as a natural innovation (ETZKOWITZ & LEYDESDORFF, 1995). Pakistan is a developing nation that is actively putting several development initiatives into practice. Keeping in mind the status of these entities in a firm's performance, current study aims to investigate the role of government, academia, and industry in bringing innovation in an organization

which will boost up the firm's performance. The current research considered the positive impact of THM agents on organizational and marketing innovation which will further influence the firm's performance. In developing countries like Pakistan SMEs are striving to implement different innovative techniques in the firms which could enhance the overall performance of the firms and reduce the risk of failure, high cost and low level of expertise (Altaf et al., 2019). Present research used the THM as a theoretical base which clears the role three different external entities to in bringing innovation in firm. Empirical findings of the study disclose that in Pakistan government plays a significant role in implementing innovation in firm's process, operations and different communication techniques. Empirical analysis of the study revealed that government in Pakistan can motivate the SMEs to be innovative by collaborating with regulatory authorities and agencies. Tax rebates and funding from the government motivates the organization to take risks, revise their operation and stay competitive in the market by fostering innovative practices. Further the results reveal the positive role of academia in innovative practices. The findings of study the proved that academia has a significant role in firm's innovative practices. Academia provides it expertise which drives the organization towards new practices. This collaboration of academia and SMEs benefited both parties. It also reduces the high cost of employees as the fresh graduate are already motivated to do some innovative things which will enhance their experience also facilitates the firms of providing several incentives, training of their current employees to bring innovation organization to increase the performance of the firm.

Moving on, results of the research also give the insight of how industry collaboration with SMEs helps them in organizational and marketing innovation. The results of the study prove the positive significant relationship of industry with SMEs in Pakistan. The findings of the study demonstrate that when SMEs build strong and healthy relationships with their suppliers, vendors, and other industrial agents it helps them in bringing innovation in the organization.

Furthermore, the current research also examined the relationship of organizational and marketing innovation with a firm's performance and unveiled that innovation in the firms is considered as positive influencer for firm's performance. More importantly the findings of the study proved that both innovations are equally important for better performance as marketing innovation captures the new customers and communicate with them differently as compared to their competitive firm and organizational innovation changes the norms, culture operations and processes of the firm which makes the healthy internal environment of the firm.

5.IMPLICATIONS

The research has some practical and theoretical implications which are discussed below.

5.1 Theoretical implication

The research has significant contribution in the theoretical portion. Firstly, the research defines the role of THM agents and their collaboration in the context of

Pakistan which was previously lacking in the literature. Secondly, the research used the THM for improving the firm's performance, which was neglected in the previous literature and needed to be studied. The present research provides insight to the scholars about the importance of government, academia, and industry to bring the innovation in the firm which is the most required need for today's firms in order to have good performance. The study underpins that collaboration of SMEs with the agents of THM is an essential element because it leverages the firm's performance, keeps the firm updated and helps in creative ideas execution. Thirdly, the study highlighted that innovation in terms of organizational innovation and marketing innovation influence the firm's performance and pave the path for the firm towards growth. The study helps the scholars in identifying the types of innovation which could be backed by the THM agents to have an increased overall performance of the firm. The research also emphasized that in today's market it has become obligatory to be innovative because trends of the market are changing day by day and SMEs should have to be updated according to the changing trends to stay in the market. SMEs in developing nations like Pakistan have less resources, funds and skills to be innovative in this vein the present research provides the solution to the scholars that how a firm can utilize the several entities for the enhancing the performance.

5.2 Managerial implications

Along with the theoretical contribution the research also has managerial contribution for the managers of SMEs of Pakistan. Firstly, the study marked the importance of government, academia, and industry for the firm's innovative activities. The research provides insight to the managers about the significant role of collaboration with other parties which could support the firm in different ways. SMEs in Pakistan are lacking behind due to less resources, lack of knowledge, proper R&D and many others which could be eliminated with a good cooperation with government, academia, and industry. The study used organizational and marketing innovation which helps the managers to understand the role of innovation in today's market for improving the firm's performance. The present research's focus was on how the SME in Pakistan could effectively utilize the government cooperation, academia cooperation and industry cooperation for having increased firm performance which helps the mangers to understand the advantages of good collaboration with these entities. The study also examined the role of organizational innovation and marketing innovation which effectively enhance the overall performance of the firm and helps the managers to understand how these types of innovation could be useful for firm. Furthermore, based on the findings of the research the researcher posits that in Pakistan SMEs are facing tough competition form the large and multinational organizations and SMEs alone are not sufficient to compete these organizations therefore, the managers should build positive and strong relationships with the THM entities which will help them in executing innovation and boosting the firm's performance.

6.LIMITATIONS AND FUTURE RECOMMENDATIONS

Despite the valuable contributions, the present study also has some limitations on the basis of which the study provides some future recommendations to scholars.

The first limitation of the study is that the study focuses on collaborating the SMEs with agents of THM for better firm performance but how these relationships could be built up is neglected in this study. Future researchers should study how different sectors of SMEs could make strong positive relationship with the THM agents. Secondly, the study only focusses on organizational and marketing innovation from the perspective of overall performance of the firm. Therefore, future scholars should also examine the role of other innovation types such as product innovation, process innovation to have better performance.

Furthermore, the third limitation of the study was that the present research considered the overall performance of the firm, but future research should also investigate how different performances could be improved with this innovation. The study was conducted in the limited time duration which limited its generalizability therefore, future research should expand the sample size and time duration to conduct a longitudinal study which will provide the more comprehensive results of the study.

7.CONCLUSION

The present discourse has expounded upon the Triple Helix Model (THM), elucidating its comprehensive exploration of the financial and social functions assumed by each stakeholder within innovation processes that conduce to organizational enhancement. Within the context of a dynamically evolving business milieu, innovation emerges as an imperative facet for corporate expansion. The tripartite collaboration encapsulated by the THM involving governmental, industrial, and academic entities serves as a conceptual framework fostering innovation. While the THM has found widespread application in antecedent scholarly endeavors, this study uniquely addresses its lacuna pertaining to delineating its impact on firm performance through the prism of innovation.

The empirical substantiation derived from this investigation attests to a significant positive correlation between each variable and firm performance, thereby affirming the validation of all formulated hypotheses. The empirical findings underscore the pivotal role of government collaboration with Small and Medium Enterprises (SMEs) in cultivating organizational and marketing innovation through financial support in the form of funds and grants. Furthermore, academia emerges as a consequential contributor to firms' success in innovatory pursuits, leveraging the resources of universities and higher educational institutions to ameliorate Research and Development (R&D) costs and harness the innovative potential of recent graduates.

In the competitive landscape of contemporary business, SMEs grapple with constraints arising from limited budgets when contending with larger multinational entities. Collaborative engagement with industry counterparts alleviates these challenges by facilitating funding, knowledge sharing, and fostering effective inter-organizational communication. This collaborative synergy, in turn, augments decision-making capabilities and enhances overall performance.

Consequently, this investigation concludes that, within the exigencies of the

contemporary competitive milieu where innovation is sine qua non for organizational prowess, the collaborative nexus between SMEs and the stakeholders of the Triple Helix Model is not only imperative but also foundational. The imperative for SMEs in Pakistan, therefore, lies in the cultivation of collaborative relationships with these entities, thereby deploying innovative practices as a linchpin for optimizing firm performance in an era characterized by heightened competition and the exigency of innovation.

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