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Impact of innovation types on performance of manufacturing firms in Pakistan

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Abstract

The objective of this research is to inspect that how innovation types affects the firm performance. Pakistan's Punjab province was the subject of this research which included 166 industrial businesses. The data were subjected to factor analysis and multiple regression analyses. A typology of Oslo Manual was used to determine the enquiries for the innovation types extent (OECD, 2005). Based on the Balanced Scorecard methodology, the writer dogged the enquiries for the firm performance degree. Profitability and growth are positively affected by product innovation (PTI), organizational innovation (OGI) and process innovation (PSI). Customer satisfaction and internal business procedures are positively impacted by the marketing innovation (MTI). Marketing innovation has a detrimental influence on knowledge and development enactment, despite its positive impact on learning. Customers' satisfaction with service is better explained by innovation types than by other characteristics of firm performance.

Keywords: Manufacturing Firms, Firm Performance (FMP), Innovation Types (INT), Pakistan

Innovation and Innovation Types :

To persist and achieve viable compensations in the worldwide economy, companies need to use innovation as a strategic weapon. They may enhance their performances, beat the competition and give value to their stakeholders by adopting innovative business practices.

Competitive advantage comes from innovation (Zawislak et. al., 2012, p. 15). Innovation in (OECD, 2005) is defined as "the adoption of a new or considerably enhanced product (good or service), a new marketing strategy, a new organizational method in company operations, workplace organization or external connections." The (OECD, 2005, p.47) categorized innovation as product innovation (PTI), marketing innovation (MTI), process innovation (PSI) and organizational innovation (OGI). As stated in the Oslo Manual (OECD, 2005, p. 29), the ultimate goal of innovation is to enhance business performance.

There is a favourable link between firm performance and innovation, according to a variety of research (Basterretxea and Ricardo Martinez, 2012, p.362). Innovation types had beneficial influence on firm performance in Pakistan's manufacturing enterprises, as Ul Hassan et al. (2013) found. Manufacturing productiveness innovation is more drastic and has a loftier impact on performance than provision industry innovation, according to Prajogo (2006). Some research have explored the link among firm performance and innovation types (Gunday, et al., 2011). As Damanpour and colleagues observed in 2009, innovation types have a favourable influence on firm performance. It has been found that innovativeness is related to future company success (Bowen et al. 2010). Subramanian and Nikalanta (1996) found that innovation had a favourable influence on firm performance, and that firms that innovated were more profitable. Expected favourable performance results and creative behaviour are positively linked, according to (Ul Hassan et al., 2013, p. 244-248).

Product Innovation (PTI)

Stakeholders of a business can notice a product innovation quickly. In order to be competitive in the market, it is typically necessary to invest in research and development.

Product innovation (PTI), conferring to the Oslo Manual (OECD, 2005, p.48), means the overview of an item or service that is new or considerably enhanced in terms of its features or intended applications. Improvements can be made to the product's performance or user friendliness in addition to its mechanical provisions, constituents and resources, software, and other purposeful aspects. It is emphasized in Oslo Manual of the Organization for Economic Co-operation and Development (OECD, 2005, p.48) that product innovation (PTI) may benefit from innovative technologies and information. It may be built on novel applications of current technology and knowledge, or a mix of the two. When it comes to new goods and services or enhancements to current goods and services, a product innovation is both (OECD, 2005, p. 48). By integrating present technologies and applying them in novel ways, or by adopting radical technologies, a new product can be produced. Companies have to understand consumer requirements and expectations, build goods and services that will improve their lives in order to thrive in the long run, Product innovation may have two aspects, according to Bish (2006). "Product innovation" may be in the form of both new goods and new innovations in existing products. This article recognizes the link between product innovation and technology, which is acknowledged by Tübitak (2006, p 13). Technological advancements can improve production levels, product features, product worth, and product expenses (Günay 2007, pp. 11-12), according to the World Economic Forum (WEF) (2006, p. 13). A product innovation (PTI) is the starter of innovative products or the enhancement of existing products, according to Polder et al. (2010) Firms innovate products to create efficiency. It is recognized that product innovation has three dimensions: it should be new to customers from a customer's point of view, it should be new to a company or firm from a company's point of view, and it should be modified from inside the business's present goods. Product innovation, according to Adner and Levinthal (2001), is meant to attract new clients. Companies develop new goods or change existing ones depending on consumer demands. They think that product innovation is one of the most important factors contributing to the success of a company. New product creation and product innovation are significant strategies to improve marketplace share and enactment of a

business. It is stated by (Ul Hassan et al., 2013, p.245) that Innovative product growth has a beneficial influence on firm performance, according to a number of studies.

Process Innovation (PSI)

As a technique for improving organizational efficiency, process innovation is a powerful instrument. In order to develop a process innovation, a business may embrace new technology, acquire new machines, educate their staff, and restructure their procedures.

Process innovation (PSI) is well-defined in (OECD, 2005) as "the deployment of a novel or considerably enhanced production technique." Variations in procedures, apparatus and/or software are included in this category. Process innovation can reduce item creation or supply expenses in order to enhance excellence, manufacture or supply new or considerably better goods, conferring to (OECD, 2005, p.49). A support activity is one that involves the use of techniques, equipment, or software that is new or considerably enhanced. When new or considerably enhanced information and communication technology (ICT) is used to expand the effectiveness or superiority of a maintenance commotion, it is considered to be a process innovation (OECD, 2005, p. 49). It is acknowledged by Akyos (2006, p. 4) that a process innovation (PSI) can be characterized as a novel manufacturing approach. They think that a process innovation is a change in the way work is performed. Innovative (ICTs) have led to modifications in support activities, according to Keizer et al (2002, pp.1-13). "Process innovation" is defined by Davenport (1993), Innovation in the manufacturing process and interfunctional innovation are included in process innovation. When logistics and manufacturing techniques are considerably improved or support operations such as bookkeeping, information technology, buying, and preservation are improved, Polder et al. (2010) contemplate that the process innovation (PSI) has taken place. Firemen invent processes to create new goods, according to Adner and Levinthal (2001). Firms innovate processes to reduce manufacturing costs, Olson et al. (1995) admit. A new method is applied by businesses so that they can contend with extra firms and gratify their consumers, according to Ettlie and Reza (1992). According to the authors (Ul Hassan et al., 2013, pp.245-246) Process innovation (PSI) in manufacturing businesses may have a substantial influence on the efficiency.

Marketing Innovation (MTI)

It might be easier and cheaper for a company to innovate in the marketing area than in the product area. He or she could be able to reposition a company in a market. A business may boost its sales revenue by penetrating the market. If you're looking for an innovative marketing strategy that includes major modifications in product scheme or wrapping, product settlement, product advancement, or price, you've come to the right spot. "Marketing innovation (MTI)" is well-defined in Oslo Manual (OECD, 2005) as "an activity that is intended to create new markets by responding to consumer requirements or by repositioning items in the market to improve sales." Marketing innovation (MTI), conferring to Akyos (2006, p. 5), comprises of innovative deals and marketing policies. "Marketing innovation (MTI) is consisted of marketing product performance, manufacturing system and services" (Günay, 2007,p. 15) is another statement made by the author. A marketing innovation, according to Polder et al. (2010), is a non-technological innovation. To enhance efficiency, companies innovate

in marketing strategies, according to the authors (2010). Marketers innovate through inventing new strategies and approaches for marketing, according to Chen (2006a). According to He (2006), organizations' success depends on the development of innovative marketing approaches, techniques and technologies. Marketers are changing the way they acquire client information, according to (Ul Hassan et al., 2013, p. 246).and He (2006).

Organizational Innovation (OGI)

As a result of innovation, a company's capabilities and vision are expanded, employee happiness is improved and the organization is transformed. "The adoption of a new organizational technique in the firm's business operations, workplace organization, or external connections," conferring to (OECD, 2005). Managerial strategic decisions can lead to organizational innovations that upsurge enactment of firms by plummeting managerial expenses, contract costs, and deliveries costs, increasing access to non-tradable resources, and enlightening office consummation and labour output. Conferring to Oslo Manual (OECD,2005), managerial strategic decisions can lead to organizational innovations.

New communication and cost systems can be connected to organizational innovations, according to Akyos (2006, p. 5). It has been said by Hage (1999) that an organization's ability to innovate may boost its product's quality, productivity, and ability to communicate information throughout corporate departments (Günay, 2007; p. 16-17). All other forms of innovation revolve on an organizational innovation, which is necessary to begin other types of innovation. A new work technique is an organizational innovation. An example of this would be the organization of knowledge, admittance to data, and the creation of innovative databanks. It can also be connected to establishing an organizational paradigm to boost worker engagement in pronouncement creation. Integration of R&D and production, as well as organizing commercial activities, are examples of how this concept may be applied in practice. It may be argued that the organizational innovation (OGI) provides interval and monetary advantages by enabling the collaboration of company operations. (Günay, 2007, pp. 17-18) Fusions and attainments generate organizational innovation (OGI). Conferring to Polder et al. (2010), the organizational innovation (OGI) is well-defined by innovative corporate applies, forming techniques and conclusion creation processes as well as a novel approach to the management of external relationships. Businesses modify how they structure things in order to please consumers and compete with competitors, according to Ettlie and Reza (1992) and (Ul Hassan et al., 2013, p. 246).

It's time for a balanced scorecard for firms. This technique ties a firm's strategy to its performance, using a "balanced scorecard". A firm's economic, consumer, inner corporate procedure and knowledge and evolution performances are categorized. Starts with administrative erudition and evolution, which improves inner company procedures to deliver extra worth for consumers, and ends with monetary enactment that's on par with strong financial performance.

Kaplan and Norton created the programme. In the literature, it is extensively used as a tool for evaluating business performance. Operational and strategic responsibilities are played by the balanced scorecard in businesses. Algorithms based on the Balanced Scorecard have been used in nonprofit organizations as well as in community, industrialized and facility organizations around the world. Olve, Wetter and Roy (2001) report that

Balanced Scorecard emphases on education and development, economic performance, consumer performance, and inner company operations performance, communal, industrial and provision administrations. Successful adoption of the Balance Scorecard, according to Kaplan and Norton (2001), should enable a transformation in the company. It can increase tactical intelligent, collaboration and legislative education for firms that adopt Balanced Scorecard (BSC). For Balanced Scorecard method, Kaplan and Norton (2001) cite these aspects as essentials; systems and people investments to enhance operations and provide distinct value propositions to expand the business, customers are convinced to conduct more business at greater margins with a corporation that offers innovative services and products, and For successful expansion, clients must be identified and targeted (Phillips and Louvieris, 2005, p. 202). Several companies, including DuPont, Mobil, Motorola, Tata Motors and AT&T, have utilized the Balanced Scorecard to advance their administrative enactment and fulfil their goals. "Balanced Scorecard" is a common stratagem application tool, according to Kaplan and Norton (1992). "Strategy is split down into operational strategic objectives considering the customer value proposition and financial performance," say Kaplan and Norton (1996, 2004). Internal company processes, learning, and growth are considered causally related to financial success, according to Kaplan and Norton (2004). (Öncü et al., 2013) have reported that innovation impacts firm performance.

Viewpoints of the BSC are defined as follows by Brewer and Speh (2000) and Phillips and Louvieris, (2005, pp. 202-203):

Economic Perspective: In addition to acting as a scheme of draughts and stabilities, it is the most essential component.

Consumer Perspective: Measuring the views of consumers leads to company success. (expense, reaction time, product quality etc.) or they might be broad (customer worth, customer retaining etc.)

Inner Company Operations: Customer demands should be met or exceeded by internal company operations. These are largely non-financial metrics, but they are important (excellence measures that are time based and elasticity sloping).

Innovation and Education: Works that must be completed on a regular foundation in order to please and retain clients. Competences of the future are further essential than existing ones. New product development, sales from innovative goods, and HR may all be measured.

Methodology

Research Objective

Objective of this research is to examine that how innovation types influences firm performance.

Sampling and Data Collection Methods

On 200 manufacturing firms, the population is based. Each of these companies received a questionnaire through email. The sample for this study is made up of 166 firms that responded to the questionnaire. More surveys could not be sent due to a time limit.

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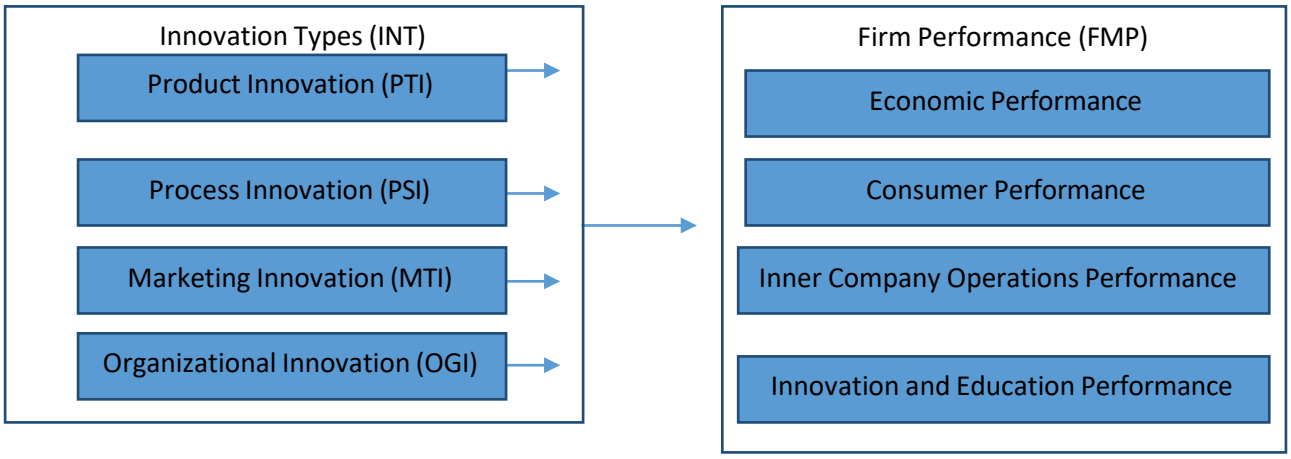
Research Model:



Research Hypotheses:

H1A: Product innovation (PTI) positively impacts Economic Performance.

H1B: Process innovation (PSI) positively impacts Economic Performance.

H1C: Marketing innovation (MTI) positively impacts Economic Performance.

H1D: Organizational innovation (OGI) positively impacts Economic Performance.

H2A: Product innovation (PTI) positively impacts Consumer Performance.

H2B: Process innovation (PSI) positively impacts Consumer Performance.

H2C: Marketing innovation (MTI) positively impacts Consumer Performance.

H2D: Organizational innovation (OGI) positively impacts Consumer Performance.

H3A: Product innovation (PTI) positively impacts Inner Company Operations Performance.

H3B: Process innovation (PSI) positively impacts Inner Company Operations Performance.

H3C: Marketing innovation (MTI) positively impacts Inner Company Operations Performance.

H3D: Organizational innovation (OGI) positively impacts Inner Company Operations Performance.

H4A: Product innovation (PTI) positively impacts Innovation and Education Performance.

H4B: Process innovation (PSI) positively impacts Innovation and Education Performance.

H4C: Marketing innovation (MTI) positively impacts Innovation and Education Performance.

H4D: Organizational innovation (OGI) positively impacts Innovation and Education Performance.

Measures of the Research

In order to recognize the overall status and tactic of businesses to innovation, the author created four questions. Researchers from Pakistan have undertaken a research to examine the link between types of innovation and innovation obstacles in Pakistan's SMEs. This study was the source of inspiration for the author. A typology of Oslo Manual was used to determine the enquiries for the innovation types extent (OECD, 2005). Enquiries of the innovation types extent have been utilized in this study. Based on the Balanced Scorecard methodology, the researcher developed the enquiries for the company performance extent. For both measurements, the Likert scale of five points is utilized. As a result of this notion, there are 4 main forms of innovation: Product Innovation (PTI), Marketing Innovation (MTI), Process Innovation (PSI), and Organization Innovations (OGI). 7 questions address Product Innovation (PTI), 4 questions address Process Innovation (PSI), 5 questions address Marketing Innovation (MTI), and 4 questions address Organizational Innovation (OGI). Inner Company Operations and Innovation and Education make up the performance of a firm. A total of 7 questions relate to Economic Performance, 4 to Consumer Performance, 9 to Inner Company Operations, and finally 6 to Innovation and Education Performance.

Analyses

Each dimension of the two measures was given a Cronbach's alpha value in order to assess their reliability. In order to determine the factor loadings for all dimension, factor analyses were undertaken. In this research Multiple Regression Analyses used to determine the influence of the innovation type's independent variables on the firm performance's dependent variables.

Data Findings

Table 1: Yearly Sales Income of Firms

	Frequency	Percentage
0-1 million RS	33	19.9 %
1-8 million RS	82	49.4 %
8-45 million RS	35	21.1 %
45 million and above RS	16	9.6 %
Total	166	100 %

Table 2: Whether Firms do R&D or not?

	Frequency	Percentage
No	26	15.7 %
Yes	140	84.3 %
Total	166	100 %

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Table 3: Ratio of R&D Financial plan to Yearly Sales Income

	Frequency	Percentage
0%-3%	97	58.4 %
4%-6%	48	28.9 %
7%-9%	6	3.6 %
10% or more	15	9.1 %
Total	166	100 %

Table 4: Innovation Types of a Firm

	Frequency
Product Innovation (PTI)	102
Marketing Innovation (MTI)	28
Process Innovation (PSI)	22
Organizational Innovation (OGI)	14
Total	166

Table 5: Independent Variables KMO and Bartlett Test Outcomes

Kaiser-Meyer-Olkin Measure of Sampling Capability	0.847	
Bartlett's Test of Sphericity	Chi-Square (Approx.)	1509.435
	df	191
	Sig.	0.000

A larger than 0.3 factor loading is found for independent variables With a KMO score of 0.847, the data are suitable for further investigation. It is less than 0.05 when the outcome 0.000 is of the Bartlett's test. In this way, it is demonstrated that variables are appropriate for factor analysis to be performed. 62.862% of the variation can be explained using factor analysis. It's a fantastic way to validate yourself. Scale reliability may be tested using Cronbach's alpha standards of independent variables.

Table 6: Independent Variables Factor Analysis Outcomes

	Factor Loadings	% Variance Explained	Cronbach α
Product Innovation (PTI)		22.205	0.812
For diverse objectives, we created an innovative	0.793		

prototype of a product made by our company.			
We used to make our goods from a diverse substantial, but we've switched to a innovative one.	0.730		
A minimum of 1 product is designed and produced in the firm.	0.730		
In the market, we have at least one product that we have manufactured.	0.686		
One or more of the goods we created are protected by patents.	0.560		
Un existing product in a certain industry is improved, and then launched on the market in its entirety as a new one.	0.534		
Our company manufactures items using high-tech tools and equipment.	0.528		
Process Innovation (PSI)		21.422	0.803
There have been modifications in our company's production processes compared to previous years.	0.661		
Using computer-aided software in our company, we are able to complete manufacturing projects faster than we otherwise could.	0.538		

In our company, manufacturing costs are closely monitored, and unnecessary expenses are eliminated.	0.529		
To track the period from materials to delivery of products, we keep detailed records in our company.	0.470		
Marketing Innovation (MTI)		11.869	0.787
The packaging, design, or pricing of a product is altered in order to enhance sales in our company	0.663		
One of our clients has seen that a product we supplied can be utilized for reasons other than its intended usage.	0.657		
In our company, we're trying out some novel ways to market our items.	0.636		
Prior to the implementation of the current marketing strategy, our business employed a previous marketing strategy.	0.622		
On our company's website, you may view product characteristics, usage zones, and pricing.	0.622		
Organizational Innovation (OGI)		7.368	0.704
Our company has	0.783		

implemented intranet, database training, and other knowledge-sharing techniques.			
Recently, our business has begun to employ outsourcing (buying, recruitment, technology support, consulting, etc.) that it has never done before.	0.697		
As a result of the collaboration across functions, our business saves time and money.	0.666		
Our company uses quality administration methods such as ISO 9001.	0.433		
Overall Variance Explained (%) : 62.862			

The following are the factors that affect firm performance:

Table 7: Dependent Variables KMO and Bartlett Test Consequences

Kaiser-Meyer-Olkin Measure of Sampling Capability	0.859	
Bartlett's Test of Sphericity	Chi-Square (Approx.)	2663.554
	df	326
	Sig.	0.000

Independent variables have factor loadings over 0.3. With a KMO rating of 0.859, the records are suitable for additional examination. It is less than 0.05 when the outcome of Bartlett's test is 0.000. In this way, it is demonstrated that variables are appropriate for factor analysis to be performed. A factor analysis explains 58.75 percent of the variation. It's a fantastic way to validate yourself. When appraising the dependability of scale, Cronbach's alpha values are acceptable.

Table 8: Dependent Variables Factor Analysis Outcomes

	Factor Loadings	% Variance Explained	Cronbach α
Economic Performance		21.19	0.698
Marketplace share	0.831		
Incomes from new products Sales	0.762		
Effectiveness	0.712		
Efficiency	0.635		
Revenues from sales of all products	0.597		
Return over investment	0.597		
Inventory revenue	0.574		
Consumer Performance		19.40	0.723
Quantity of innovative consumers	0.527		
Sales from fresh consumers	0.447		
Sales from present consumers	0.416		
Amount of consumers who gone from the firm	0.345		
Inner Company Operations Performance		11.12	0.756
For new procedures, we need new technology.	0.785		
Ratio of new goods to total products	0.762		
New product development using technology	0.712		
Production expenditures	0.699		
Period of production	0.692		
Period to inauguration of a fresh product	0.688		
Consumer gratification	0.648		
Imperfect products rate	0.590		
Fraction of in time carriage of products	0.584		
Innovation and		7.06	0.708

Education Performance			
Staff cheerfulness	0.786		
Collecting data about innovative products	0.737		
Collecting data about consumers	0.729		
Staff throughput rate	0.659		
Amount of staff propositions	0.637		
Amount of applied employee propositions	0.635		
Overall Variance Explained (%) : 58.750			

Table 9: Firm Performance and Innovation Types Multiple Regression Consequences

	Economic Performance		Consumer Performance		Inner Company Operations Performance		Innovation and Education Performance	
Independent Variables	Standardized Coefficients Beta	Sig.	Standardized Coefficients Beta	Sig.	Standardized Coefficients Beta	Sig.	Standardized Coefficients Beta	Sig.
1 (Constant)		0.041		0.087		0.225		0.476
Product Innovation (PTI)	0.232*	0.063	0.173**	0.032	0.052**	0.033	0.086**	0.037
Process Innovation (PSI)	0.160**	0.012	0.152**	0.049	0.017*	0.098	0.103*	0.057
Marketing Innovation (MTI)	0.098*	0.072	0.046*	0.054	0.054**	0.047	-0.013*	0.088
Organizational Innovation (OGI)	0.015*	0.086	0.113**	0.013	0.072**	0.016	0.063**	0.040
R	0.320		0.451		0.362		0.2999	
R square	0.102		0.203		0.131		0.089	
F	1.692		1.08		3.491		1.054	

*p < 0.10, **p < 0.05

Economic performance is explained by 10.1%, consumer performance by 20%, inner company operations performance by 13%, and Innovation and education performance by 8.8%. Consumer performance is better explained by the innovation type than by other firm performance factors.

H1A: Product innovation (PTI) positively impacts Economic Performance.
Product innovation (PTI) positively impacts Economic Performance. H1A accepted at a significance level of 0.10.

H1B: Process innovation (PSI) positively impacts Economic Performance.

Process innovation (PSI) positively impacts Economic Performance. H1B accepted at a significance level of 0.05.

H1C: Marketing innovation (MTI) positively impacts Economic Performance.

Marketing innovation (MTI) positively impacts Economic Performance. H1C accepted at a significance level of 0.10.

H1D: Organizational innovation (OGI) positively impacts Economic Performance.

Organizational innovation (OGI) positively impacts Economic Performance. H1D accepted at a significance level of 0.10.

H2A: Product innovation (PTI) positively impacts Consumer Performance.

Product innovation (PTI) positively impacts Consumer Performance. H2A accepted at a significance level of 0.05.

H2B: Process innovation (PSI) positively impacts Consumer Performance.
Process innovation (PSI) positively impacts Consumer Performance. H2B accepted at a significance level of 0.05.

H2C: Marketing innovation (MTI) positively impacts Consumer Performance.
Marketing innovation (MTI) positively impacts Consumer Performance. H2C accepted at a significance level of 0.10.

H2D: Organizational innovation (OGI) positively impacts Consumer Performance.

Organizational innovation (OGI) positively impacts Consumer Performance. H2D accepted at a significance level of 0.05.

H3A: Product innovation (PTI) positively impacts Inner Company Operations Performance.
Product innovation (PTI) positively impacts Inner Company Operations Performance. H3A accepted at a significance level of 0.05.

H3B: Process innovation (PSI) positively impacts Inner Company Operations Performance. Process innovation (PSI) positively impacts Inner Company Operations Performance. H3B accepted at a significance level of 0.10.

H3C: Marketing innovation (MTI) positively impacts Inner Company Operations Performance.
Marketing innovation (MTI) positively impacts Inner Company Operations Performance. H3C accepted at a significance level of 0.05.
H3D: Organizational innovation (OGI) positively impacts Inner Company Operations Performance.
Organizational innovation (OGI) positively impacts Inner Company Operations Performance. H3D accepted at a significance level of 0.05.
H4A: Product innovation (PTI) positively impacts Innovation and Education Performance.
Product innovation (PTI) positively impacts Innovation and Education Performance. H4A accepted at a significance level of 0.05.
H4B: Process innovation (PSI) positively impacts Innovation and Education Performance.
Process innovation (PSI) positively impacts Innovation and Education Performance. H4B accepted at a significance level of 0.10.

H4C: Marketing innovation (MTI) positively impacts Innovation and Education Performance.
Marketing innovation (MTI) positively impacts Innovation and Education Performance. H4C rejected at a significance level of 0.10.

H4D: Organizational innovation (OGI) positively impacts Innovation and Education Performance.
Organizational innovation (OGI) positively impacts Innovation and Education Performance. H4D accepted at a significance level of 0.05.

Conclusion

Product innovation (PTI), process innovation (PSI), and organizational innovation (OGI) all have beneficial effects on economic performance, consumer performance, inner company operations performance, and innovation and education performance, among other factors. Consumer performance and inner company operations performance are positively affected by the marketing innovation (MTI). Marketing innovation (MTI), on the other hand, has a detrimental influence on innovation and education performance. If the sample size is increased, this finding may be altered. To increase their firm's success, firms must engage in the proper

types of innovation. Consumer performance is better explained by the innovation types than by other firm performance factors. In conclusion, Pakistani manufacturing businesses' innovative style leads to better customer service. In addition, the businesses' innovation strategies have led to improvements in their inner company operations, economic performance, and innovation and education performance, respectively. This investigation is hampered by a lack of time. To better evaluate the data, further data may be collected. To achieve high performance, firms should select the proper types of innovation. Academicians and companies in the field of innovation are anticipated to benefit from this research.

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