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Impact Of Innovation and Training & Development on Operational Performance: Mediation of Green Lean Six Sigma

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Abstract

This research tends to discover the influence of innovation and training & development on the operational performance of an organization. Performance is an integral function of the success of any organization. Therefore, this research tends to discover the influence of innovation and training & development on the operational performance of an organization. Green lean six sigma is also an important concept that emerged in the last few years. The motive of this research is to explore the mediation of green lean six sigma among innovation, training & development, and operational performance. The current study uses a quantitative method to explore this current topic. The data utilized in this study was obtained from both customers and employees of textile and apparel manufacturing facilities located in Pakistan. Questionnaires were used to collect data from the respondents of the research. Results of the study indicate innovation and training & development are significantly associated with an organization's operational performance. Green lean six sigma also mediated the association between innovation, training & development, and operational performance. This study also includes limitations, future direction, and practical and managerial implications.

INTRODUCTION

Performance is the go-to factor for all organizations around the world. Performance is one of the indicators of the success of an organization. Performance is directly linked with several positive outcomes that help an organization to be more successful and productive in organizational life. Performance and especially operational performance depend upon several different factors. These factors also change with organization type, demographics, and cultures. Key success factors are different for different organizations. This current study also explores the variables that contribute to the operational performance of the textile sector. This study also explores the critical role of green lean six sigma in the operational performance of an organization. Several organizations follow some sort of quality management to advance the performance of an organization. But such initiatives regarding quality management don't produce the required results (Asif et al. 2009). There is a difference in results and this is all due to the usage of a universal

approach regarding quality management that does not depend upon context. There are also some the studies like Wu et al (2011) that suggest that firms' internal and external environments are also two important factors that should keep in mind while applying a universal approach through quality management initiatives and also prove that there is no single approach to implement and achieve the benefits of quality management initiatives. Performance is a critical concept that plays a vital part in the achievement of social and the whole organization purely depends upon its operations, therefore, the operational performance of an organization is an important variable to study for the success of the organization. The prime motive of the study is also to explore the antecedents of operational performance in textile and apparel manufacturing units of Pakistan.

BACKGROUND OF THE STUDY

The textile and apparel manufacturing industry makes a significant contribution to a country's economy. However, it lacks adequate preparation and government support. Pakistan is mainly an agrarian country, with agriculture providing income for the vast majority of the population. As a result, Pakistan advantages from an ecological balance that is favorable to the functioning of its apparel and textile manufacturing facilities. Pakistan has an abundant supply of needed supplies for textile and apparel manufacturing. Because of its strategic importance, Pakistan is an ideal location for textile and apparel manufacturing. Pakistan's economic reliance on textile and apparel manufacturing units is significant due to its strategic geographical location and abundant natural resources. Nevertheless, despite its potential, this sector has been overlooked and has failed to produce the anticipated amount of revenue as a result of restrictions imposed by government policies and regulations.

However, compared to other sectors, this one employs a disproportionately large number of people with lower wages. When comparing Pakistan to rival countries such as India and Bangladesh in terms of textile and apparel products, it is clear that these countries have received significant benefits in the form of energy and tax breaks from their respective governments. As a result, these industries are experiencing rapid growth and success, outperforming Pakistan in this regard. The cooperation of the government and other stakeholders is critical in all sectors, including this one. However, the government's neglect of this sector has led to a decline in profit margins and revenues. Human resource management is one of the major tools used by contemporary organizations around the world for competitive advantages.

There are several functions included in human resource management like hiring, recruitment, performance management, performance appraisal, and training and development. The human resource department has become essential for the success of an organization. Training is one of the core areas in which the human resource department trains its individuals to perform better and guide them to achieve more in less time. That is to provide necessary training to the employees by keeping in mind the future goals of an organization. Training and development help an organization to be more productive through the utilization of its resources. The human resource department is responsible for the necessary training in the whole organization to make its employees productive. Therefore, by keeping in mind the significant importance of the topic this research is conducted to explore the potential influence of innovation and training &

development on the operational performance of an organization. There are several performance indicators but operational performance is crucial and critical for the success of an organization. Green lean six sigma is also an approach that is used by contemporary organizations and this study also discover the mediation of green lean six sigma among innovation, training & development, and operational performance of an organization.

The textile and apparel manufacturing sector is one of the major sectors of Pakistan's economy. This sector also contributes heavily to the GDP of Pakistan but for the past many years, this sector lacks governmental and researcher support because there are no studies on the topic that how to advance the OP of an association. Operations are the most critical factors for an organization and success is only achieved through operational performance. This research, therefore, attempts to explore the problem by examining the impact of innovation and training & development on the operational performance of an organization. That is the big gap provided by the literature and there are inadequate revisions on this topic related to the textile and apparel sector of Pakistan.

The main objective of the current study is to propose a resolution for Pakistan's textile and apparel manufacturing facilities, focusing on improving operational efficiency through the implementation of innovative strategies and training and development initiatives. This basic idea behind the current study is to explore the critical factor like innovation and training & development that contributes to the operational performance of an organization. Green lean six sigma is also an important construct that helps an organization achieve environmental objectives through operational performance and the persistence of the current research is also to explore the mediation of green lean six sigma among innovation, training & development, and operational performance.

- How innovation contributes towards the operational performances?
- How training & development contributes to operational performance?
- How green lean six sigma lead towards the operational performance?
- How green lean six sigma mediates the relationship among innovation and operational performance?
- How green lean six sigma mediates the relationship among training & development and operational performance?

LITERATURE REVIEW

Green manufacturing is described as the process followed by an organization during manufacturing that focuses on the utilization of green factors like green operations, recycling, green design, elimination of waste material, and reduction of waste material that occurred during the manufacturing process of a firm (Luthra et al., 2013). The major focus of this concept is to carry some ecological factors through the industrial process of an organization and that also targets to improve environmental performance. That is a renewable production process that installs eco-friendly operations and the process in which workers use minimum resources and reduce the waste and pollution which is produced during the manufacturing process and also moderate the emission during the manufacturing (Junaid et al., 2023). Bureau of Labor Statistics focuses on the fact that employees and workers should be provided with this training for green manufacturing.

Employees and workers should provide training regarding the generation and use of fuel, heat, and electricity from renewable resources like biomass, wind, solar, ocean, geothermal, and hydropower. Employees and workers should provide training to use specific practices and technologies in their manufacturing process. Training should be provided to use green technologies to decrease and remove conservatory gases, waste and gathering, reprocess and reutilize of wastelands. Employees and workers should train to practice that includes conservation of natural resources.



Figure 1.
McKinsey 7S Framework

These days industrial organizations round the biosphere are now focusing on consciousness of eco-friendly and the production of sustainable products. Their focus is to produce green products and they began to act accordingly. Organizations are now more focused on the improvement in environmental performance by eliminating or reducing waste. According to Luthra, Gargand A. Haleem, (2014), manufacturing organizations around the globe are now more focused to reduce environmental risk and increase environmental sustainability. There are multiple benefits of using green manufacturing because it has several advantages for internal and external customers of an organization (Nazir & Yu, 2023). Execution estimation is liable for the preparation of the essential purposes of an association and the execution of its arrangement.

Meanwhile an association's exhibition is achieved complete the diverse aerobics of the administration cycle, it has complex attributes. An association's purposes and marks must to be connected with the exhibition proficient concluded these purposes and targets. At the point when tested by wild worldwide contest, an association needs to achieve elite execution in changed regions to obtain and keep up with seriousness (Niazi et al., 2023). As an association develops through cutting edge producing innovation, the presentation of a-list fabricating rehearses, and worldwide contest, it works on its multi-faceted functional execution. An association that has accomplished predominant execution in one region can synergistically work on one more through learning. A

complex proportion of functional execution is abstracted as a intentional or recognized serious execution and is assessed by price, excellence, flexibility, and passage measures.

Lean Manufacturing

Lean assembling is a strategy wherein squander delivered during the assembling system is either diminished or disposed of without obstructing the efficiency of the assembling system. The idea of lean assembling was gotten from Toyota's 1930 model, "Toyota Production System" and the term lean was first planned by John Krafcik in 1988 and was first characterized by James Womack and Daniel Jones in 1996. Lean assembling framework depends on 5 key standards.

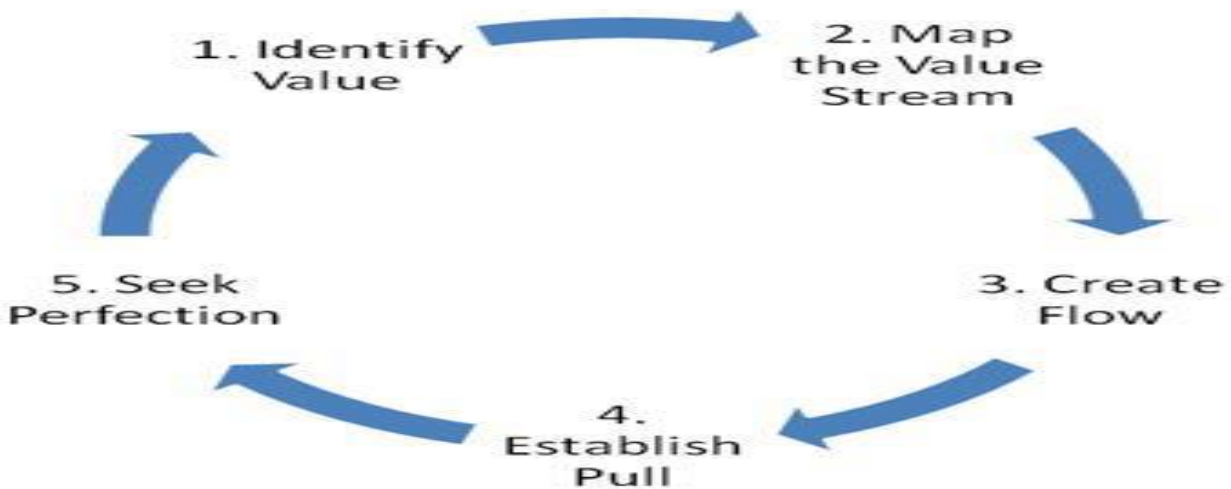


Figure 2.
Principles of Lean

In the nutshell, the significant job of lean assembling is to improve the exhibition of the assembling system accordingly expanding the hierarchical presentation by generous improved administrations to customers. Lean assembling can't be characterized in a solitary heading as this idea is as yet developing (Hines et al., 2004). The loss as far as lean assembling is represented as "something besides hardware, materials, parts, space and time which are not crucial for add the worth in the end result of the assembling framework" (Russell and Taylor, 2000). Lean gathering is a gadget that can update the output and advantage of companies (Shurrab and Hussain, 2018). Cost, main time, and excellence control essentially influence the business' overall useful capability. Lean observes can make the collecting practices in the business earlier and less extravagant. According to Carvalho, Gonçalves, and Silva (2019), Businesses can use LM development to secure an advantage in the business.

Embracing LM frameworks gives associations an advantage over others. Endeavors passing things on through lean practices are in like manner expected to use environment pleasing methodologies. Research showed that a conclusive goal/purpose in being lean and rehearsing ecological wellbeing is to decrease waste from errands (Wang et al., 2021). Subsequently, LM execution helps the two affiliations and the neighborhood. Rest thought puts a prevalent on in-energy practices and dealer associations (Naeem et al., 2021). The fundamental spotlight in lean gathering is on getting rid of practices that don't improve a thing/organization (Carvalho et al., 2019). Cost cuts and working execution

out and out impact efficiency and customer steadfastness, as of late communicated. Nevertheless, various leveled challenge has made of late (Hariyani and Mishra, 2022). Associations will get a high ground by embracing LM procedures. It chips away at the lifestyles by giving business open entryways. In Pakistan, this industry has contributed through and through to money related improvement. It contributes 8.5% to GDP (Hashim, Baig, Amjad, Nazam, and Akram, 2019). Various associations are obligatory to recognize exercises that make and upsurge money related worth (Porter and Kramer, 2019). Affiliations have expected to recognize eco-obliging practices (Afridi et al., 2020). Studies have in like manner examined a development in care, the general populace, and accomplice pressure associated with green normal issues (Foo, 2018).

Six Sigma

The idea of Six Sigma is that it is a statical proportion of variety which can be practically exact. It assists the association with accomplishing quality and benefit also. In the nutshell, it is a tool stash for the quality and supervisory crew to think about issues that they were looking during the assembling system (Krishnan and Prasath 2013).

Green Lean Six Sigma

The idea of Green Lean Sigma (GLS) isn't just new for the Indian assembling associations yet in addition the businesses all over the planet. It has been seen that not many works had been finished in regards to this and, surprisingly, not very many works had been performed concerning the Indian assembling association.

Innovation and Operational performance

Advancement assumes a significant part in fostering an association's versatility in a dubious changing business climate. Development assimilated by associations is intriguing, significant, and hard for adversaries to impersonate. From the writing survey, development can be broken down into various sorts: revolutionary versus gradual, shady versus exploratory, regulatory versus specialized, and item versus process. Extremist developments produce major changes and show clear takeoffs from existing practices, while steady advancements bring about a little takeoff from existing practices (Niazi et al., 2023). Manipulative advancements allude to the improvement of existing items or administrations and are like gradual developments, while exploratory advancements include the presentation of new items or administrations to meet client and market needs and are like revolutionary advancements (Khan, Imran Zaman, et al., 2023). Since the interest of this study lies in specialized developments, a conversation of specialized and regulatory developments is given in more detail.

Specialized advancements relate to new innovation, items, and administrations while managerial developments are related with new cycles, strategies, and hierarchical design. In this sense, specialized advancements can be separated into item and cycle developments. Item advancements are new, and fruitful items or administrations formed and brought into the commercial center. Process advancements are selections of new creation or administration tasks (S Khan et al., 2022). Other exploration additionally arranges specialized development into lower aspects: item advancement and interaction advancement. Be that as it may, the limits between item advancement and handle development appear to be hazy in light of the fact that item advancement might

bring about process advancement as well as the other way around (Khan, Ali, et al., 2023). These two kinds of advancements can be perceived as being reciprocal connections. It is widely believed that one of the primary challenges that associations face is maintaining or working fairly on execution. They then adopt innovations that are purportedly more equipped to accomplish this goal (Hernandez and Jimenez, 2008; Herring and Roy, 2007). According to some research (Badescu and GarcesAyerbe, 2009; Hernandez and Jimenez, 2008), mechanical developments can boost a company's visibility and interest in new innovations can increase productivity and sustainability. To what extent does an implemented data framework contribute to the attainment of authoritative goals and benefits is how DeLone and McLean (2003) define the framework's viability. Companies are more likely to reap the benefits of their investments and see improvements in functional performance if they prioritise functional adequacy above project data framework viability (Davenport, 1998). However, due to the high rate of failure of implemented mechanical developments such as venture data frameworks, there is a great deal of concern (Davenport, 1998).

Training & development and operational performance

One of the main tools in the arsenal of modern businesses' quest for global competitive advantage is human resource management. Hiring, recruiting, managing performance, evaluating performance, and developing employees are all part of human resource management. A company's HR division is now crucial to its success (Khan, Hyder, et al., 2023). In order to help employees perform better and get more done in less time, the human resources department focuses on training as one of its primary training areas. That is, planning for the future while giving workers the training they need is essential (Khan, Anwar, et al., 2023). A company can maximize its resource utilization with the support of training and development programs. It is the responsibility of the human resources department to ensure that all employees receive the training they need to be productive. An organization's people are its most valuable asset and the bedrock of any successful business (Khan et al.). Companies invest heavily in human capital because they believe that showcasing HR will ultimately boost the company's visibility. In order to achieve its fundamental goals, an organization relies on execution, a complex process with many moving parts (Mwita, 2000).

According to Mwita (2000), the association's objectives can only be achieved through exhibition, so execution is essential for building the association's viability and proficiency, which in turn helps achieve the hierarchical objectives. However, the question of how a representative can work more effectively and efficiently to build an organization's growth and efficiency arises (Abbas and Yaqoob, 2009). The representative's craft depends on many factors, such as flexible planning, preparation, and so on. Careful preparation planning is essential for the association (Armstrong, 2000). The needs of the representatives should inform the strategy of the training (Ginsberg, 1997). Organizations that invest in a good training setup that takes into account employee needs and the organization's priorities tend to do well (Boudreau et al., 2001). It would appear that Training configuration plays a crucial role in both hierarchical and representative execution. A lack of resources, such as time and money, is the sole cause of an inadequate preparation setup (Tsaur and Lin, 2004). Workers benefit greatly from getting information about their work through hands-on preparation (Deming, 1982).

People learn more from their own practical experience than from academic studies. Spend less and have more time on hand-on preparation (Heras, 2006). Companies should invest in their employees' hands-on training because it pays off in the long run (Taylor et al., 2004). In order for their representatives to learn in a practical way, it is beneficial for associations to provide them with hands-on training (Baum, 2007). Training and development rely heavily on the delivery style (Braga, 1995). Salespeople have a keen understanding of the conveyance method Armstrong, Michael (2000). If a presenter isn't attracting an audience and delivering his material with flair, he's probably wasting everyone's time (Griffin a Neal, 2000). It According to Phillip Sailors et al. (2005), a mentor's role is to captivate the audience during the instructional meeting.

In the field of training and development, the way information is conveyed is crucial. When employees don't put in the time to prepare for their jobs, they often end up underperforming (Garavan, 1997). Compared to unprepared representatives, prepared workers do better (Boudreau et al., 2001). Any group should provide its employees with training to help them achieve the overarching goals of the other group more effectively (Heras, 2006). The association's overall presentation is enhanced through preparation and advancement (Shepard et al., 2003). Although it takes more money to provide training to employees in the long run than it initially cost (Heras, 2006). Each association ought to foster its workers as per the need of that time so they could rival their rivals (Braga, 1995). In this way, that's what we conjectured that:

- H1:** Innovation is significant positive associated with Operational Performance.
- H2:** Training & development is significant positive associated with operational performance.
- H3:** Green lean six sigma is significant positive associated with operational performance.
- H4:** Green lean six sigma mediates the relationship among innovation and operational performance.
- H5:** Green lean six sigma mediates the relationship among training & development and operational performance.

RESEARCH MODEL

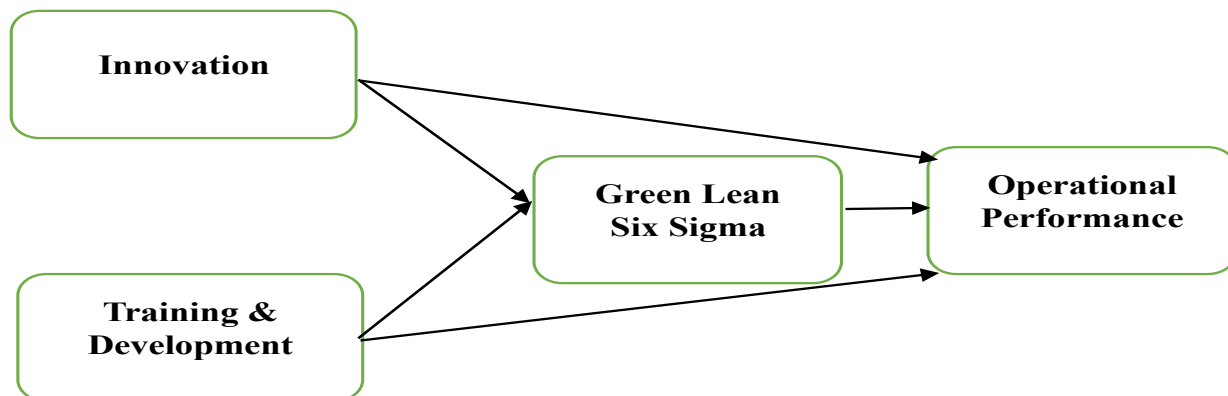


Figure 1.
Research framework

RESEARCH METHODOLOGY

Research Philosophy

The philosophical foundations of research rest on three tenets: positivism, interpretivism, and critical theory. Ontology, epistemology, methodology, and the research study method are the four assumptions that combine to form a paradigm. A positivist, or scientific paradigm, or quantitative approach, is the foundation of this research project. Within the positivist paradigm, the researcher stresses the existence of reality in nature, which is grounded in ontological assumptions. Workers' perceptions of unfairness are causing them emotional distress. The foundation of epistemological arguments is the idea that in order to conduct research, one must first learn about and then analyze the specific reality or phenomenon under study. Thirdly, positivism presupposes that researchers use methodology to lay out their strategies and plans, and methods to carry out those strategies and plans. According to Khan et al. (2023), the researcher in this study employs a deductive strategy for data analysis and then moves on to an inductive strategy for result interpretation. This research makes use of the positivist paradigm. Deductive research is often linked with quantitative methods, such as surveys and experiments. Questionnaires are the primary means of data collection in this investigation. We used formal study methods (research is conducted to explain any existing relationships and phenomena) and cross-sectional quantitative research (covering a single point in time).

This study focused on the garment and textile sector in Karachi, Pakistan's largest city, which is home to the vast majority of garment and textile units. This sector was chosen due to its significant contribution to Pakistan's economy and its potential for growth and development. The research design employed in this study was a cross-sectional approach, which involved collecting data from a sample of garment and textile units in Karachi at a single point in time. The cross-sectional design was chosen because it allows for the collection of data from a large number of units, providing a snapshot of the current state of lean manufacturing adoption in the garment and textile sector. This design fits with the study's objectives, which aim to explore the current state of lean manufacturing adoption in the sector and identify the challenges and opportunities associated with its implementation.

However, it is acknowledged that the cross-sectional design has some limitations. For instance, it does not allow for the examination of causal relationships between variables or the tracking of changes over time. Nevertheless, the study's objectives are focused on understanding the current state of lean manufacturing adoption, and the cross-sectional design is well-suited to achieving this goal. To strengthen the research design, a mixed-methods approach was employed, combining both quantitative and qualitative data collection and analysis methods. This allowed for a more comprehensive understanding of the phenomenon under study, as well as the ability to triangulate findings and increase the validity of the results. Furthermore, the study's sample was selected using a stratified random sampling technique, which helped to ensure that the sample was representative of the population of garment and textile units in Karachi. This research would be carried out using primary data as mentioned in the literature review as well as primary data that we would be collecting from a local brand's practicing EM. Where we will conduct interviews and questionnaires by handing them out to the consumers of the brand. This

questionnaire would objectively probe questions that would draw a difference between the sales from traditional and sales from experiential marketing (Khan, Qabool, et al., 2023). Then after collecting the data, we would look for respondent errors and draw out workable responses which we could use to run the tests. For this report, we would apply the statistical tool of T-test that would establish significance or insignificance values between the variables. After the tests, the results would be tabulated and analyzed together with the interviews, and conclusive discussions and recommendations together with limitations of the studies would be devised.

The scope of the study

The independent and dependent variables in this study are training and development and innovation, respectively, and they have a direct correlation with operational performance. In order to learn how green lean six sigma mediates the relationship between innovation, training, and development and operational performance, this study will focus on local brands in Karachi, specifically their branches.

The relevance of the study

The current study primarily aims to examine how training and development and innovation affect operational performance in Pakistani textile and apparel units. Nowadays, every company is trying to implement green lean six sigma because of all the benefits it offers, especially since lean manufacturing has become a challenge for modern businesses (Sherbaz Khan, Rizwana Rasheed, & Mustafa Hyder, 2022). Pakistani garment factories are all going all out to implement green lean six sigma manufacturing in the hopes of attracting and retaining more customers. While many garment factories are experimenting with green lean six sigma, only a handful have found success.

Variables of the study

As an independent variable, lean manufacturing of garment manufacturing units forms the basis of the present research study. Green lean six sigma mediates the relationship between innovation, training and development, and an organization's operational performance.

Population Framework

The current study's population consists of customers and employees from Pakistani textile and apparel manufacturing units.

Social demographics

For this demographic analysis, we accounted for age, education level, marital status, and gender.

Research Framework

This study gathered data from the garment and textile sector in Karachi because it is Pakistan's largest city and home to the vast majority of garment and textile units.

Target Population

This study's intended participants are members of Karachi's private textile and garment industry. The textile industry's stellar reputation and the reliability of its well-known stakeholders are major draws for both domestic and international buyers. We use green lean six sigma to measure the effect of innovation and training and development on an organization's operational performance; thus, the textile and garment sector is the ideal setting for this type of research.

Unit of Analysis

Customers and workers in the textile and garment industries served as the data sources for this study, which used individuals as its unit of analysis. Because of their familiarity with the company's procedures and policies, the respondents are both customers and employees.

Sample Size, Sampling Technique

The current study's sample size is 213 clients who are employed in the garment and textile industry. The respondents were asked to provide quantitative data regarding their opinions on a particular brand. In our study, we gathered responses from respondents using a convenience sample, which is a kind of non-probability sampling.

Instrument development

We gathered raw facts by structuring a Questionnaire using 5-point Likert scale (Strongly disagree 1, Disagree 2, Neutral 3, Agree 4 and Strongly Agree 5). This questionnaire is consistent of the well thought Questions, with the total 40 items sliced into 5 parts:

- Part 1 consists of innovation.
- Part 2 considering of training & development.
- Part 3 focused on green lean six sigma.
- Part 4 focused on operational performance.

Data Analysis Tool

We gathered two types of information from the study's participants. We used SPSS 26 to analyze quantitative data that we gathered from textile and garment industry customers. The vast majority of researchers endorse SPSS, making it the most popular software in the field. In order to discover the relationship among the study's variables, we employ reliability, descriptive, correlation, and regression analysis. Since the primary goal of this research is to examine how green lean six sigma mediates the relationship between innovation, training and development, and operational performance, regression analysis is employed in this study.

RESULTS

The questionnaire for data analysis in this study has two parts. The first section contains questions about demographic variables, and the second section contains study variables; both are closed-ended, and the data is analyzed using SPSS.

Reliability Analysis

Table1.
Reliability Analysis

Variable	Cronbach's Alpha	No. of Items
Innovation	0.818	05
Training & development	0.757	05
Green lean six sigma	0.831	07
Operational performance	0.796	10

The above table displays the Cronbach Alpha reliability analysis of the study variables. The table shows that all of the variables in the current study (innovation, training and development, green lean six sigma, and operational performance) have Cronbach alpha reliability values greater than 0.7. The tables show that innovation is measured using a 5-item scale with a Cronbach alpha reliability of 0.818, training and development is measured using a 5-item scale with a Cronbach alpha reliability of 0.757, green lean six sigma is measured using a 7-item scale with a Cronbach alpha reliability of 0.831, and operational performance is measured using a 10-item scale with a Cronbach alpha reliability of 0.796. This demonstrates that all of the study's variables have good Cronbach alpha values, allowing us to proceed with further statistical analysis of the data.

Correlation Analysis

Table2.
Correlations

Variables	1	2	3	4
Innovation	1			
Training & development	.638**	1		
Green Lean Six Sigma	.882**	.714**	1	
Operational Performance	.706**	.715**	.828**	1

The variables analyzed for this study's correlation can be seen in Table 4.1.6. There is a strong positive correlation between all of the study's variables, as shown in the table. There is a strong positive correlation between innovation and training and development ($r=.638$, $p<.01$), green lean six sigma ($r=.882$, $p<.01$), and operational performance ($r=.706$, $p<.01$), as shown in the table. Training and development, green lean six sigma, and operational performance are positively associated, according to the table ($r=.714$, $p<.01$; $r=.715$, $p<.01$). Green lean six sigma and operational performance are significantly correlated ($r=.828$, $p<.01$) according to the table. A strong correlation exists between all of the variables in the study. This gives some indication of the variables' acceptability or rejection for the study.

Regression Analysis

Table 4.1.7 displays the model summary for the hypothesized research model. The table shows the model's R squared.72 demonstrates that innovation, training, and development, as well as green lean six sigma, are responsible for a 72% increase in operational performance.

**Table 3.
Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.848	.720	.714	.24271

**Table 4.
Coefficients**

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.191	.195		.976	.331
Innovation	.303	.070	.267	4.028	.000
Training & development	.249	.059	.255	4.191	.000
Green lean six sigma	.796	.205	.749	7.544	.000

Table 4.1.8 displays the regression coefficients for the hypothesized research model. Table shows that the t statistics for all variables are greater than the standard of 2, indicating a good fit. The table indicates a significant ($p < .01$) and positive ($B = .303$) correlation between innovation and operational performance. So, the data from this study support H1 of the study, which states that innovation is significantly positively associated with operational performance. The table indicates a significant ($p < .01$) and positive ($B = .249$) correlation between training and development and operational performance. The data in this study support H2 of the study, which states that training and development have a significant positive relationship with operational performance. The table shows that green lean six sigma has a significant ($p < .01$) and positive ($B = .796$) relationship with operational performance. So, the data in this study support H3 of the study, which states that green lean six sigma is significantly positive associated with operational performance.

**Table 5.
Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.828	.685	.683	.25551
2	.848	.720	.714	.24271

Table 4.1.9 displays the model summary for the hypothesized research model. The table shows the model's R squared.72 demonstrates that innovation, training, and development, as well as green lean six sigma, are responsible for a 72% increase in operational performance.

**Table 6.
Coefficients**

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.507	.185		2.743	.007
Green lean six sigma	.879	.048	.828	18.483	.000
(Constant)	.191	.195		.976	.331
Green lean six sigma	.796	.105	.749	7.544	.000
Innovation	.303	.070	.267	4.028	.000
Training & development	.249	.059	.255	4.191	.000

Table 4.1.10 displays the regression coefficients of the proposed research model. The table indicates that the t statistics for all variables exceed the threshold of 2, indicating a strong fit. The table indicates that in step 1, the introduction of green lean six sigma is associated with a significant ($p < .01$) and positive ($B = .879$) relationship with operational performance. In step 2, even after controlling for green lean six sigma, there is still a significant ($p < .01$) and positive relationship between innovation and operational performance. This indicates that green lean six sigma acts as a mediator in the direct relationship between innovation and operational performance. The data from the study also provides support for H4. After controlling for green lean six sigma, it is evident that training & development remains highly significant ($p < .01$) and positively correlated with operational performance. This indicates that green lean six sigma acts as a mediator in the direct relationship between training & development and operational performance. The data from the study also provides support for H5.

HYPOTHESES SUMMARY

Table 7.
Hypotheses Summary

Hypothesis	Supported/ Supported	Not Supported
H1: Innovation is significant positive relationship with operational performance.	Supported	
H2: Training & development is significant positive relationship with operational performance.	Supported	
H3: Green lean six sigma is significant positive relationship with operational performance.	Supported	
H4: Green lean six sigma mediate the relationship among innovation and operational performance.	Supported	
H5: Green lean six sigma mediate the relationship among training & development and operational performance.	Supported	

DISCUSSION AND CONCLUSION

This research-based study is conducted to explore the impact of innovation and training & development on the operational performance of textile and apparel manufacturing units in Pakistan. Innovation and training & development are considered to be the go-to factors for any kind of organization. Organization around the world are now investing in innovation and training & development activities in order to enhance and boost their performance. Success of an organization purely depends upon its performance and there are multiple factors that contributes in the performance of the organization (Sherbaz Khan et al., 2022). The basic aim of the current research-based study is also to investigate the antecedents of operational performance in textile and apparel manufacturing units in Pakistan. Green lean six sigma is also an emerging topic in the manufacturing industry and all the organizations and governments working hard to preserve their environment and produce defects free products. Environment is also an important element of human eco system and a lot of research is conducted to explain the action that will help to protect our environment in long run. Number of organizations are also adopting some of the strategies that helps them to produce defects free products (Khan, Zaman, et al., 2023). There are number of benefits that organizations can attain through the production of defects free products like that will reduce their cost, that will reduce their waste and that also increase their revenue and profit by reducing their

expenses. This study is also essential because there are different viewpoints to increase the operational performance of an organization and that study will serve us to keep an eye on innovation, training & development and green lean six sigma in order to increase operational performance of textile and apparel manufacturing units in Pakistan. Pakistan is an agriculture country and number of residents rely on income from agriculture and textile products. If the performance of our textile and apparel sector improves with the passage of time then that will also cause to increase the textile revenue of the country. Innovative and new products are the dream of any human being and people are more concerned about their dressing and they look good to themselves and others if they wear new, innovative and fashionable dresses (Khan, Zaman, et al., 2023). In the same manner training and development of the employees are essential for the growth of any sector. If we provide training to our employees that will be beneficial for the organization in different ways. Good and reputable organizations spend heavily on the training & development of their employees and this will able them to serve their organizations in better way and that also boost the performance of the organization.

DISCUSSION

Quantitative data discussion

Results of this study shows that innovation is significant positive associated with operational performance of textile and apparel manufacturing units in Pakistan. This current research-based study is all about the operational performance and the factors that contributes in the operational performance of textile and apparel manufacturing sector in Pakistan. This study is also important because it explore the two different angles named as innovation and training & development that comes from manufacturing and human resource sectors of the organization. Innovation means to develop new and innovative products, that helps the organization to stay attach the customers with them. Customer are considered to be the central unit in all the activities performed by a certain organization. If the need, want and demand of a customer is being fulfilled by the desired organization then the customer will stay loyal with the firm and that also buy that product from the same organization. All the customer around the world is satisfied with new, trendy, fashionable and innovative products. So, if the desired product innovative is produced by the firm that will cause to increase the operational performance of the organization.

Green lean six sigma is the modern approach for environmental sustainability through operational performance. Green lean six sigma includes practices and techniques to achieve performance of environment by reducing waste and saving resources. Through this method green reduce environmental waste through environmental practices and six sigma minimize the defects and process variation. This study proves that green lean six sigma mediated the relationship among innovation, training & development and operational performance. Some relationship of innovation and training & development is direct with the operational performance of an organization and some relationship is through the green lean six sigma so that mediates the relationship among innovation, training & development and operational performance of textile and apparel manufacturing units in Pakistan.

Qualitative data discussion

This study also includes 2 qualitative questions. Firstly, role of six sigma was asked from the respondent and they respond that lean six sigma plays a vital role in our work environment as a quality tool. It helps to better the process and quality of the product. Erratic planning, lack of periodization, patience and no measurement process is the problem faced by organization. Lean six sigma plays major role to reducing waste and remove process variation and process defects during production so it helps to reduce the cost and help to produce move in particular time, which increase our productivity which also increase sales and company's operational Performance is also increased. Tree plantation, Innovation in machine which use less water, Recycling of waste fabric, Recycling of water to fabric, using clean energy, Dry dyeing and not used harmful chemicals drying dyeing and washing treatment are green practices used by organizations. Low capital to support green practices, poor collaboration with financial terms of green invitation teams and look of integrative strategies are the changes faced when company implement green practices. Atomization, recycling, logistics and movement of goods products development innovation are the steps taken by organizations to enhance operational performance.

Classroom training, off side training, a technical expert from abroad, project management training, anger management training and soft skills are training for the employees. Company increases their operational performance through atomization, better utilization, employee training, product development and process development. Top management should appreciate green practices, innovation, training and development and invest money in training. Second respondent respond that Lean Six Sigma play a vital role in our work environment it reduces work and defects and reduce process variations. Lack of patience and knowledge are the challenge faced by organization. It reduced wastages, remove defects, process smooth and efficient and save cost of production so it's increase operational performance. Core for water, Product manufactured in wet processing stages with a technology that reduce water consumption. Low capital, less knowledge and top management willingness locking are the challenges faced by organization.

Digital Printing reduction of 30% water consumption, Ozone Textile technology, reduces 65% water consumption, solving 80% of chemical product, Caustic recovery plant, Heat recovery boiler are the innovations that can company apply for operational performance. Skill set training, classroom training, technical expert session, anger management training, and project management training are the training that can be provided to the employees. Research and development of product, development in process, development in quality checking and quality control and atomization are the factors for the performance. They are willing to adopt these initiatives in industry they invest their money and appreciate these practices. After adopting green practices and green labelling in products we gain more order from buyers and it increases our sales and market share also and our profit as well.

THEORETICAL CONTRIBUTION

This research study has many theoretical contributions as this study explore the impact of innovation and training & development on operational performance of textile and

apparel manufacturing units in Pakistan. Furthermore, this study also explores the mediation of green lean six sigma among innovation, training & development and operational performance. Operational performance is an emerging topic with green lean six sigma in textile and apparel manufacturing sector in Pakistan. This research will open new avenues for the future research in this topic because this is first attempt in the textile and apparel sector of Pakistan to investigate the antecedents of operational performance. This study also provides a comprehensive framework to boost operational performance of textile and apparel manufacturing units in Pakistan. This study shows that innovation is significant positive associated with operational performance of an organization and green lean six sigma mediated the relationship of innovation and operational performance. In the same pattern this study also provide theoretical contribution as training and development is also significant positive associated with operational performance and this relationship is also mediated by green lean six sigma. This is just a single study that opens new door of innovative research to explore and test new variables in these relationships. There are number of different variables that can be tested among these independent and dependent variables. This research opens new door and avenues for future and expand the present research in different ways.

PRACTICAL IMPLICATIONS

The results of the current study are also had important practical implications as the managers and owners of the textile and garments firms can focus on the innovation and training & development due to its direct association with operational performance. That will improve their performance and so due to increase in performance the resources of organization can be best utilize to gain maximum benefits out of that. Innovation and training & development is widely used by different sectors and organizations around the world but its application is limited to textile and apparel manufacturing units in Pakistan. So, this study will provide foundation for the mangers to use this innovation and training & development due to its multiple long-term benefits for an organization. Therefore, the current research tends to explore the factors that will defiantly help the organizations to improve operational performance of organization through innovation and training & development. The current study explores that textile and apparel manufacturing brand must consider green lean six sigma to boost operational performance of textile and apparel manufacturing units in Pakistan. So, this is an important practical implication for the managers of textile and apparel manufacturing units to use innovation, training & development and green lean six sigma to boost operational performance of apparel and textile units in Pakistan.

LIMITATION AND FUTURE DIRECTIONS

The current study, like any research endeavor, is not without its limitations. It is essential to acknowledge and communicate these limitations to future researchers, who can then strive to mitigate them and enhance the reliability and validity of their findings. One of the primary limitations of this study is the relatively small sample size of 159 quantitative respondents. This constraint may impact the generalizability of the study's findings, as the results may not be representative of the larger population. Future research on this topic should aim to incorporate a more substantial sample size to increase the confidence in the results and enhance their generalizability. Another significant limitation of this study is the restricted time frame, which limited the ability to generalize the results. Future studies

should consider employing a longitudinal research design, which involves examining the same data at multiple time points. This approach would allow for a more comprehensive understanding of the phenomenon under study and account for situational factors that may influence participants' responses. The cross-sectional research design employed in this study, which involved gathering all the data at a single point in time, is another limitation. Future research should consider using a mixed-methods approach, combining both quantitative and qualitative data collection and analysis methods, to provide a more comprehensive understanding of the phenomenon under study. Additionally, the respondents' limited comprehension level is a significant constraint of this study. Many respondents lacked the necessary education to properly understand and respond to the questions posed, which may have introduced error or bias into the results. To address this issue, the researchers verbally translated the questions to the respondents and inquired about their opinions. In future studies, it would be essential to translate the questionnaire into Urdu to ensure that all respondents can understand and respond to the questions accurately.

Other potential sources of error or bias in this study include social desirability bias, where respondents may have provided answers that they believed were socially acceptable rather than their true opinions. Future research should consider using anonymous or confidential data collection methods to minimize this bias. Furthermore, the study's reliance on self-reported data may have introduced error or bias, as respondents may not have accurately reported their experiences or opinions. Future research should consider using objective measures or data collection methods to minimize this bias. Despite these limitations, the findings of this study can be extrapolated to other industries, such as telecommunications, banking, and education. Future research can apply this research model to other sectors, providing a more comprehensive understanding of the phenomenon under study. By acknowledging and addressing these limitations, future research can enhance the reliability and validity of their findings, providing a more accurate understanding of the impact of lean manufacturing on organizational performance.

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