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The impact of effective implementation of the 5S concept on company performance: A Case Study of a Manufacturing Company

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ABSTRACT

Purpose-This study examines how 5S affects a Pakistani manufacturing company's operation. The investigation was quantitative. A Pakistani electrical manufacturer received the poll. At least 180 replies were collected from 200 samples.

Design/Methodology/Approach-This study investigated hypotheses from a conceptual model of the 5S concept and productivity using partial least squares structural equation modeling (PLS-SEM). The statistics showed that 5S improved the organization's productivity.

Findings-The findings also demonstrated that the 5S technique increased role productivity and organization success. Successfully applying 5S can boost company productivity. Productivity increases using the 5S method—Sort, Straighten, Shine, Standardize, and Sustain. Each of the five independent variables (5S variables) significantly affected the dependent variable prediction.

Implication-The study found that implementing 5S in an organization should be seen as a full productivity system. Productivity does not increase with 5S. However, it encourages lean manufacturing, Six Sigma, Total Productive Maintenance, and Kaizen, which boosts company productivity.

Keywords: Organizational Performance, Lean Manufacturing, 5S, PLS-SEM, Productivity Measurement

1. INTRODUCTION

The manufacturing industry is experiencing tremendous development, which can be attributed to the substantial influence of globalization (Abdullah et al., 2022). The manufacturing industry has been compelled to adopt proactive measures in response to various changes brought about by globalization, including shifts in market demand,

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product design, product life cycle, production transformation, and technological advancements in manufacturing capabilities (Akram, Khan, et al., 2022). This is necessary to ensure the industry's competitiveness in the current business landscape. Currently, the manufacturing business emphasizes product quality, cost reduction, and timely delivery. The organization significantly emphasizes efficiency (Singh & Ahuja, 2014). The manufacturing sector is primarily characterized by the prevalence of large-scale manufacturing (LSM), which holds a significant share of 76.1 percent within the industry and contributes 9.73 percent to the gross domestic product (GDP). Small-scale manufacturing accounts for 2.12 percent of the overall Gross Domestic Product (GDP) and holds a sectoral share of 16.6 percent (Statista, 2023).

Manufacturers face difficulties and challenges due to several factors, such as escalating manufacturing prices, suboptimal efficiency, compromised quality, and safety concerns. (Todorovic & Cupic, 2017) Assert a rapid evolution in client wants, wishes, and tastes, necessitating manufacturing enterprises to adjust accordingly (Abbas et al., 2022). Various ideas and techniques in the manufacturing sector can boost output and efficiency (Vasudevan et al., 2022).

Lean manufacturing, often known as lean operations, is a fundamental concept within the Toyota Production System (TPS) framework. This concept has been widely adopted globally due to its notable advantages in terms of cost-effectiveness, quality, and flexibility in reactivity. According to Bayo-Moriones et al. (2010), the primary objectives of lean systems are waste elimination and cost reduction. According to an essay by Yahaya & Aldraiweesh, (2023), the 5S technique has been proposed as a prospective remedy for enhancing the quality of organizations inside the workplace. According to Makwana and Patange (2022), the 5S concept is a highly significant instrument in lean manufacturing. This concept is recognized as a strategic approach for facilitating change and fostering learning within organizational development. According to Shahriar et al., (2022), the 5S methodology is employed to enhance quality by eliminating non-valued variables and optimizing the level of value contributed to the firm.

Similarly, Guleria et al. (2022) asserted that this notion has been empirically demonstrated as an effective instrument for Lean practitioners operating inside the

manufacturing environment. The 5S concept contributes to the process of enhancing productivity and improving quality. The subsequent sections of this article encompass the diverse bodies of literature grounded on the conceptual framework. The following areas will comprehensively examine the research techniques and data analysis methods employed in the conceptual model. The final section encompasses the discussion, presentation of results, and conclusion.

Based on previous studies, a prevalent issue in the industrial sector is subpar organizational performance, which can be attributed to various factors. According to Abbas et al., (2022), the primary consequence is a notable decline in organizational productivity. Based on a study conducted by Akram et al. (2022), it was found that the manufacturing plant of a metal and rubber company exhibited an unsanitary and disorganized environment, which resulted in safety concerns for employees and impeded the capacity to track products throughout the manufacturing process, both internally and externally (Gupta, 2022). As mentioned earlier, the circumstances have given rise to several apprehensions regarding the production and quality of the company's products Berhe (2022) did an empirical investigation.

The concept of the 5S is at the center of this examination, and it is from this concept that the research goals are derived. Within this study, we will look into each idea separately and see how it fits into the company's general success. In this inquiry, the degree of output an organization generates is called its "performance." The term "performance" is used to describe it.

2. LITERATURE REVIEW

2.1. Organizational Performance

Any firm or organization's fundamental objective is to generate profits to establish and sustain market competitiveness. Hence, evaluating an organization's performance holds significant importance as it provides insights into the efficiency and effectiveness of the company's operations. Ali & Islam, (2020) asserted that organizational performance is substantial in management research. According to Riaz and Hassan, (2019), executive performance can be defined as the capacity of an organization to

successfully maintain its operations by effectively adjusting all systemic processes associated with its pursuit of objectives. Khan and Liu, (2023) posit that organizational effectiveness assessment should not be confined to a singular criterion, such as manageability.

2.2. Productivity Measurement

The term "productivity" is used to describe a method of calculating the output as a percentage of the resources used. How much work (products and services) is created concerning how much goes into making that output (labor, capital, land, energy, etc.) (Berhe, 2022). Tripathi et al., (2022) also similarly defined productivity as the ratio of work to input for two key resources: labor and capital. As a result, productivity measurement accuracy can be defined in terms of productivity. Pangestu et al., (2022) claim that two key aspects affect an organization's productivity: external circumstances that cannot be changed and internal factors that can be changed. Queiroz et al., (2022) distinguish between "single-factor productivity" and "multifactor" as two ways to evaluate output. According to the United States Government in 2015, multifactor productivity is the ratio of results (created products and services) to inputs (two or more resources). Conversely, single-factor productivity measures the efficiency of converting resources into new output. In this research, one-factor productivity served as the criterion for success.

2.3. Concept of Lean Manufacturing

In response to the intense competition within the market, manufacturers have devised numerous frameworks and concepts as strategic approaches to adjust their production systems effectively. Toyota Production System (TPS) is a business concept that emphasizes the ongoing development of an organization, the promotion of employee well-being, and the adherence to established work protocols. The abovementioned ideology has significantly shaped the operational strategies of globally renowned manufacturing enterprises, with Toyota Motor Corporation being a prominent example Minh, (2023). Lean Manufacturing, also known as Lean Operations, is a method of continuous improvement that falls inside the framework of the Toyota Production System. The concept underlying the Toyota Production System (TPS) entails a structured

approach to arranging manufacturing facilities to optimize the production of goods with superior quality, minimal expenses, and reduced lead times. The primary emphasis of all Toyota Production System (TPS) approaches revolves around continuous improvement and waste elimination (Kumar et al., 2022). Aadithya et al., (2023) posit that implementing lean manufacturing methodologies enhances the overall efficacy and efficiency of the organization, leading to a more pronounced improvement in product quality and customer value.

According to Shahbaz and Shaikh, (2019), the approach of the concept towards the production process is centered on waste reduction and value maximization. According to Hussain et al., (2019) article, the goal is to find waste that interferes with the manufacturing process, including lead times, quality, costs, and disturbances in the production flow. Yahaya and Aldraiweesh, (2023) Suggested that waste removal and continual improvement are fundamental components of Lean Manufacturing. In a similar vein, Wassan et al., (2022) asserted that lean operations possess the capability to effectively cater to the precise requirements of clients through ongoing enhancements, all while minimizing wasteful practices. Eliminating waste from production lines and boosting output efficiency are the overarching objectives.

2.4. Concept of 5S and Total Quality Management

Implementing the 5S approach is advised for identifying waste that may be present inside the workplace. The 5S concept is a checklist tool utilized in lean manufacturing methodologies, primarily emphasizing "housekeeping" practices to minimize waste. The 5S idea is a philosophical framework introduced by Hiroyuki Hirano during the 1980s within the context of the Toyota Production System (Polancich & Pilon, 2019). Hence, the 5S Lean strategy emerges as a prospective resolution for enhancing organizational quality inside the workplace. The primary objective is to eliminate inefficiencies and reduce waste in the production process (Helmold, 2023). The 5S idea emphasizes utilizing optimal technology within the production line and cultivating a comprehensive perspective to attain a product without defects. By creating and upholding standard operating procedures in the workplace, the 5S methodology is utilized to reduce unnecessary waste and increase production (Abu Bakar et al., 2019). Waste reduction,

according to Moi and Sing, (2021), can be accomplished by establishing a tidy, well-organized, and productive workplace. The 5S concept offers several benefits, such as improved visibility of root causes, higher staff morale, a better first impression on clients, and more productivity due to shorter search times. The elements of the 5S concept are Sort, Straighten, Shine, Standardize, and Sustain (Mikhailovsky et al., 2020).

Total Quality Management (TQM) is an all-encompassing management philosophy that serves as the cornerstone for an organization's continuous improvement initiatives, according to Permana et al., (2021). Many people consider Total Quality Management (TQM) to be the best framework for encouraging ongoing improvement and reaching peak performance. This strategy aims to improve output and quality at the same time. The objectives of Total Quality Management (TQM) comprise several significant elements, such as the elimination of inefficiencies, improvement of the quality of the product or service, shorter delivery times, lower costs, increased employee satisfaction, and continuous improvement (Abimbola et al., 2021).

2.5. Quality Measurement, Quality Assessment Cost, and Quality Awareness

By developing a method for evaluating quality, quality measurement evaluates the current state of an organization's quality. Systematically recording the quality status makes identifying and implementing appropriate correction and improvement initiatives possible. Non-conformance issues have the potential to be found. The Cost of Quality (COQ) is a metric to identify areas where remedial action is necessary and financially advantageous (Alzoubi et al., 2022). This is also intended to ascertain the expenses of maintaining quality standards and quantify these quality-related costs' monetary worth. Quality awareness fosters organizational awareness by disseminating information through supervisor training sessions, imparting knowledge to employees, and offering tangible proof by creating booklets, movies, or posters. This initiative aims to enhance consciousness and understanding among all company members (Yanamandra & Alzoubi, 2022).

2.6. The Impact of 5S on Company Performance

Yahaya & Aldraiweesh, (2023) Implemented 5S at an automobile company and conducted a case study. The study examined the relationship between two 5S

characteristics and the organization's performance. Hirschman Vehicle, an Austrian auto component manufacturer, conducted the investigation. From January through December 2016, reviews were done every month. A year-old 5S-based 17-question audit checklist was used for these inquiries. In a scholarly research piece by Candea and Gabor, (2023) the 5S strategy improves workplace efficiency. Twenty manufacturing firms, both small and medium-sized, from the Nagpur area in India were used for this analysis. Here are four companies from the chemical, manufacturing, agricultural, and automotive industries. Kumar and Khan, (2023) investigated the 5S methodology in Delhi's copper wire drawing sector. The issue was successfully resolved after the company implemented the 5S idea. The findings indicated a statistically significant enhancement. An adequately cleaned workplace is conducive to good health and employee satisfaction while minimizing frustration and enhancing productivity (Kumar & Khan, 2023). The provision of personal equipment to machine operators results in a reduction of unnecessary time consumption. This leads to the integration of search time. Your machine's overall functionality and lifespan can be significantly enhanced by thoroughly cleaning and conducting meticulous inspections. After completing the file organization process, employees exhibited a discernible improvement in their overall mood, characterized by a reduction in frustrations and the elimination unnecessary conflicts. The warehouse has been structured to facilitate the efficient functioning of all departments within the organization (Gupta et al., 2022).

In a scholarly publication Gupta and Mittal, (2023), the Rasch model was employed to examine the effects of 5S and Kaizen, a practice of continuous improvement, on the organizational performance of an automotive firm based in Malaysia. Most of these enterprises are situated in the northern peninsula of Malaysia (Vasudevan et al., 2022). This article employs a quantitative evaluation methodology. The survey was disseminated to individuals serving as management representatives inside the business. The Rasch model was used as a statistical framework for examining items and dependability among participants.

2.7. Theoretical Description

The 5S technique is a methodology employed to enhance the productivity of pre-

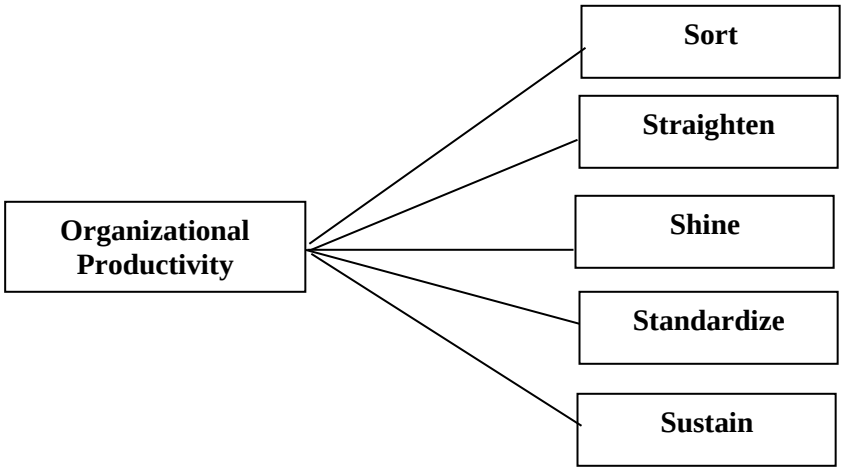
existing plant specimens. In the majority of instances, the implementation of a 5-S program serves as an integral element in the establishment of a visual workplace. The 5S theory places significant emphasis on the performance of an efficient workplace organization, fostering a conducive work atmosphere, minimizing waste, and enhancing quality and safety standards. Waste elimination is considered advantageous as waste represents a form of loss. Additionally, it is well known that there needs to be more potential for increasing productivity and raising the caliber of output in an unorganized work environment characterized by time and material waste. The lean methodology employed in business process management is founded upon the fundamental principle of waste reduction. This approach has a simple basic idea: removing steps that do not add value and fixing flaws. However, the implementation of these principles necessitates the use of strategic planning. The 5S methodology is a structured strategy aimed at minimizing physical waste and establishing uniformity in equipment and procedures within a functional unit. According to the principles of 5S, the implementation of cleanliness, organization, and standardization is of utmost importance in the development of work processes that are highly effective and productive.

2.8. Research Framework

This research is grounded in the research framework of the impact of the 5S concept on productivity. Based on prior research conducted on the subject matter, it is evident that the use of the 5S methodology can exert a substantial influence on a firm's performance, namely in terms of productivity. However, it is important to note that this study focuses on conducting an individual examination of the 5S idea, as depicted in Fig. 1. The Independent variable encompasses the components of the 5S notion, while the dependent variable signifies the organization's productivity. The company's productivity is contingent upon the efficiency of the manufacturing line and the contributions made by individuals.

Figure 1

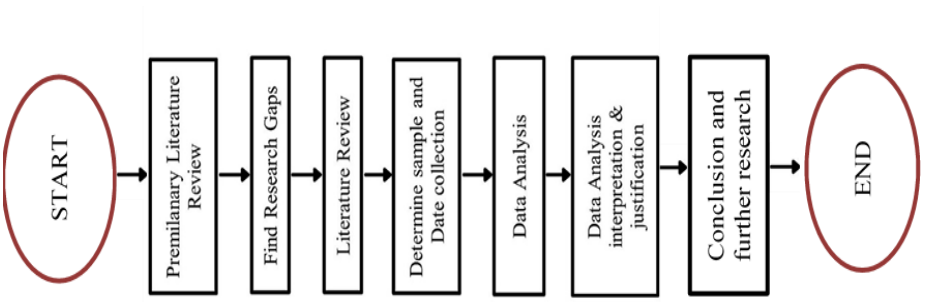
Conceptual Framework



3. RESEARCH METHODOLOGY

Figure 2 depicts the research plan and methodology used in this project. During every step, rigorous research methodologies and validity measures are applied to make sure that the information gained is comprehensive and credible and that the data produced are subjected to suitable validation procedures. The research technique employed in this study is based on the work of (Lotfi et al., 2018).

Figure 2



3.1. Sample Selection

The study's sample consisted of engineers employed in the manufacturing department of the chosen firm. This group was selected because it meets the requirements of the 5S concept, which calls for participation from people working on the production line who have the knowledge to help reach the study paper's goals. The research study has a sample size of 100 participants. Convenient sampling is the methodology employed in this investigation. Obilor (2023) posits that convenience sampling is a sampling technique that involves the gathering of samples based on their convenient proximity to a certain location or their availability at said site.

3.2. Measuring Instrument

Sections A and B of the questionnaire are distinct from one other. Gathering information about the respondents' demographic characteristics is the main goal of Section A of the questionnaire. These categories cover a wide range of topics, such as age, income level, employment history, religion, ethnicity, and other relevant factors. An audit checklist in Section B can be used to assess how well your company is currently applying the 5S method. Information from other studies and scholarly articles that concentrate on the implementation of the 5S approach in a manufacturing setting was used to build the survey used in this investigation. The study conducted by Kobarne et al., (2016) guided the questionnaire's development. Using the 5S checklist technique, the researchers audited a company that specializes in the production of pistons and piston pins. In addition, Dulhai, (2008) included a 5S audit into Autocar Exhaust's operating framework, a manufacturing organization, to enhance overall productivity. In the context of metal manufacturing, Costa et al., (2018) employed the 5S technique with effectiveness.

3.3. Data Analysis Method

SEM-PLS (Structural Equation Modeling-Partial Least Squares) was used for the analysis in this study, and Smart-PLS 3.0 was used to facilitate this. According to the scholarly works of (Davis & Cosenza, 2005) and (Pituch & Stevens, 2015), the selection of an appropriate technique is considered to be the most crucial and foundational aspect

of a research project. It is the next version of a multivariate method used to check the validity and reliability of model data. It is called Structural Equation Modelling (SEM). Multiple regressions and other early techniques were shown to be suitable for assessing both individual components and the relationships between them. Regression analysis is used mostly for forecasting, while correlation analysis evaluates the link between dependent and explanatory variables. In the scholarly community, PLS-SEM has been singled out as a popular study analysis tool. According to Tabachnick and Fidell, (2007), the soft modeling approach is considered more adjustable in terms of measuring the dimensions of the sample. The absence of assumptions regarding the data distribution characterizes it.

It's easy to tell the difference between PLS-SEM and CB-SEM, or Partial Least Squares Structural Equation Modelling and Covariance-Based Structural Equation Modelling. Covariance-Based Structural Equation Modelling (CB-SEM) is an appropriate technique to use when the goal of the research is to test and verify a hypothesis. Research in this setting is best approached through the use of PLS-SEM. Similarities between multiple regression analysis and PLS-SEM (Nitzl, 2016). Multiple regression analysis can be considered as the conceptual precursor to PLS-SEM. PLS-SEM aims to optimize the explanation of variance in the dependent variable, while concurrently assessing data quality through an examination of the characteristics of the measurement model. The PLS-SEM method determines its parameters by the utilization of a series of least squares estimations, which serves as the basis for its nomenclature. Simultaneously, the term "partial" originates from the iterative estimation approach, wherein parameters are determined incrementally, with emphasis on specific latent components rather than the entire model (Hair et al., 2016). The PLS-SEM approach provides several improvements in comparison to previous multivariate techniques. The system exhibits a high level of versatility in its capacity to accommodate diverse premises and sample sizes. The current investigation utilized the PLS-SEM methodology, which is widely recognized as an appropriate approach for the chosen theoretical framework (Lee et al., 2011).

4. RESULTS AND ANALYSIS

A comprehensive set of 200 questionnaires was distributed by email, resulting in 180 surveys being completed, generating a response rate of 90%. The factory in question was situated in a prominent industrial area of Pakistan and specialized in electronic production.

Table 1

Demographic Information

Variables	Frequency (N)	Percentage (%)
Gender		
Male	160	88.8%
Female	20	11.2%
Age		
25 or below	50	27.77%
25 to 30	80	44.44%
30 or above	50	27.77%
Education level		
Diploma	100	55.55%
Bachelor's Degree	50	27.77%
Master's Degree	30	16.66%
Years of Working		
2 years or less	50	27.77%
2 to 3 years	70	38.88%
3 years or more	60	33.33%

4.1. Measurement Model

The theoretical underpinning of the study is a reflective model. You can show that the construct and the related measures are linked by showing a cause-and-effect link. Based on the findings of this investigation, as depicted in Figure 1, reflective indicators can be regarded as a representative sample encompassing all possible entities within the conceptual boundaries of the construct (Hair et al., 2016). Therefore, to ascertain the credibility of a reflective measure, it is crucial that all indicator items may be ascribed to

a singular underlying notion and that indicators of a certain construct exhibit a robust correlation. In the given framework, each element must demonstrate the ability to be replaced or interchanged with another. According to Hair et al. (2016), the significance of a construct remains unchanged even if any one indicator item is removed as long as the construct exhibits adequate reliability. The fundamental relationship between a concept and its measurements implies that any alteration in the evaluation of the underlying attribute will result in corresponding changes in all associated indicators. Hence, following the framework of Partial Least Squares Structural Equation Modeling (PLS-SEM), a collection of reflective indicators is often denoted as a scale (Hair et al., 2016). The primary focus of Partial Least Squares Structural Equation Modelling (PLS-SEM) is centred Tabachnick and Fidell (2007) around the evaluation and analysis of the reflective model. Evaluating reflective measurement models entails computing average variance extracted (AVE) to prove convergent validity; evaluating composite reliability to gauge internal consistency; and gauging the dependability of specific indicators.

Additionally, the evaluation of discriminant validity is conducted by employing the Fornell-Larcker criterion and cross-loadings. In the following sections, the author provides a comprehensive analysis of the many methodologies employed in the assessment of reflective measurement models. The measurement model derived from the results of Partial Least Squares Structural Equation Modelling (PLS-SEM) is illustrated in Table 3.

Table 2

Results of Measurement Model Evaluation

Latent Variables	Indicators	Outer Loadings	Composite Reliability	AVE	Discriminant Validity	Alpha
Productivity	P1	Deleted	0.960	0.516	0.718	0.953
	P2	Deleted				
	P3	0.145				
	P4	0.134				
	P5	0.194				
Shine	SHN1	0.831	0.925	0.674	0.821	0.902
	SHN2	0.901				
	SHN3	0.787				

Straighten	SHN4	0.858	0.938	0.726	0.852	0.874
	SHN5	0.767				
	SHN6	0.778				
	STRN1	Deleted				
	STRN2	0.792				
	STRN3	0.876				
	STRN4	0.853				
	STRN5	0.885				
	STRN6	Deleted				
Sort	SRT1	Deleted	0.859	0.669	0.818	0.756
	SRT2	0.819				
	SRT3	0.829				
	SRT4	Deleted				
	SRT5	Deleted				
	SRT6	0.817				
	SRT7	Deleted				
Standard	Std1	0.863	0.926	0.677	0.823	0.904
	Std2	0.879				
	Std3	0.924				
	Std4	0.809				
	Std5	0.714				
	Std6	0.778				
Sustain	STN1	Deleted	0.941	0.800	0.895	0.916
	STN2	0.949				
	STN3	0.913				
	STN4	0.895				
	STN5	Deleted				
	STN6	0.816				

According to Awang et al. (2010) suggestion, it is advisable to maintain the recently generated scales of the measurement model if they achieve or above a threshold of 0.50. Hence, it is advisable to exclude the external loadings that fall below the threshold of 0.50 in the measurement models. This is because such loadings suggest a diminished influence of indicators with values below 0.50 on the respective constructs. The relationship between the elements is depicted in Table 3, wherein the loadings span from 0.134 to 0.949. Following the elimination of indicators P1 and P2, the productivity indicators failed to satisfy the criterion of being greater than 0.50. Hence, the observed level of productivity failed to achieve the set threshold and was deemed unacceptable. To fulfill the requirement of surpassing the threshold value of 0.5, the subsequent indicators

were excluded: Sior1 and 6, Sort 1, 4, 5, and 6, along with Sust1 and Sust 5. The exclusive focus on productivity is considered insufficient, as other underlying factors are deemed more dependable. According to Haslinda et al. (2018), the initial phase involves assessing the reliability, internal consistency, and validity of the measurement model, with particular attention to convergent and discriminant validity. The dependability of the components inside the measurement model was assessed by employing composite reliability (CR) and Cronbach's alpha (CB alpha) tests. The data presented in Table 3 indicates that the CR values varied between 0.859 and 0.960, while the CB alpha values ranged from 0.756 to 0.953. The outcomes of both experimental circumstances in the investigation exceeded the suggested threshold value of 0.70, as proposed by (Seddik, 2019). Hence, the variables have demonstrated elevated levels of reliability and acceptance.

The outcomes of evaluating the average variance extracted (AVE) through the perspective of convergent validity are presented in Table 3. It is crucial to recognize that the AVE value should be at least 0.50. Table 3 shows the Average Variance Extracted (AVE) values for all variables, which have been seen to exceed the threshold of 0.50. This suggests that the degree to which the variables exhibit convergent validity can be deemed satisfactory or reliably established. Based on the findings of Fornell and Larcker (1981), the average variance extracted (AVE) can be considered acceptable if it exceeds the threshold of 0.50.

4.2. Evaluation of Structural Model

Each hypothesis was tested using the bootstrapping technique to determine its statistical significance. Table 4 displays the outcomes of an in-house evaluation of the model. Table 4 shows that the T-statistics for the effects of shine, straighten, sort, standardize, and sustain on productivity all exceed the significance threshold of 1.96.

Table 3

Results of Path Coefficient

Mean, STDEV, T-Values, P-Values						
	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T statistics (|O/STDEV|)	P Values	Result
SHINE -> P	.244	.253	.0253	8.753	.000	Accepted
SIOR -> P	.185	.182	.0173	9.75	.000	Accepted
SORT -> P	.094	.092	.0172	4.978	.000	Accepted
STDN -> P	.334	.329	.0233	15.64	.000	Accepted
SUST -> P	.231	.230	.0249	8.431	.000	Accepted

5. DISCUSSION

A thorough research and analysis were undertaken to explore the effects of effectively implementing the 5S idea on the productivity of an organization. A conceptual framework was utilized to evaluate a cohort of 180 engineers from the manufacturing division of a particular organization. The findings of the study revealed that all of the assumptions examined had a statistically significant influence on the predictive accuracy of production forecasts. The results obtained from the analysis of regression coefficients suggest that there is a statistically significant relationship between each variable representing the 5S concept and productivity. The major aim of using the 5S methodology is to reduce superfluous waste and improve productivity through the establishment of a standardized framework inside the organization. According to Heizer et al. (2017), implementing a well-organized and efficient work environment might reduce waste. The 5S idea has several advantages, including enhanced visibility of the underlying causes, heightened morale, improved customer impressions, and increased productivity by reducing search time. The 5S concept emphasizes optimizing production techniques within the manufacturing process and adopting a comprehensive perspective to ensure the manufacture of flawless products. The primary objective of implementing the 5S methodology is to minimize unnecessary waste and enhance productivity through

the establishment and maintenance of a standardized system inside the workplace. According to Hanif et al. (2023), the implementation of 5S and Kaizen methodologies, which focus on workplace organization and continuous improvement, respectively, has been found to have a significant impact on the performance of an automotive firm in Pakistan. This impact was assessed using the Rasch model.

5.1. Implication

The present case study offers significant and applicable insights regarding enhancing productivity. To continually improve and augment lean manufacturing processes, some manufacturers have implemented strategies for workplace organization and cleanliness known as the "5S" strategy. In practical terms, 5S methodology is a systematic approach to minimizing waste and enhancing productivity by establishing a well-maintained and visually organized work environment. By implementing visual signals, this methodology strives to achieve more consistent operational outcomes. The five concepts of the 5S methodology are Sort, Set in order, Shine, Standardize, and Sustain. In a professional setting, the 5S technique is commonly employed by collaborative teams to enhance the accessibility of materials for operations and promote efficiency by minimizing waste of time and resources. Hence, to improve the efficacy of the implementation of 5S practice, factory management must consider the associated costs inside the workplace.

Furthermore, it is essential to assess the ethical conduct of employees about implementing the 5S methodology. The organization can ensure the ongoing relevance and continuity of the 5S practice among support staff by imparting the requisite knowledge and learning skills through comprehensive training programs. The user's text is incomplete and does not provide any information. Upon complete adoption, the 5S technique has been found to have a positive impact on employee morale, customer perceptions, and organizational efficiency. There is an expectation that integrating continuous improvement methodologies into organizational settings will concurrently augment employee contentment, waste reduction, product quality enhancement, and lead time reduction. The 5S method encompasses more than mere cleansing techniques; rather, it is a comprehensive approach designed to enhance operational effectiveness. The 5S process is an all-encompassing cultural framework intended to improve employee

morale, ensure timely delivery, increase productivity, and elevate quality standards and costs. The 5S methodology is an all-encompassing approach that integrates various activities, contexts, and cultural elements; it transcends the simplicity of a duty list. To optimize outcomes, it is imperative that every employee has a comprehensive comprehension of the fundamental characteristics and repercussions associated with each "S" and actively engages in their ongoing application. In summary, the current investigation has yielded significant findings about the subject matter. Nevertheless, there are additional research directions that merit further examination.

The research discovered that the successful integration of the 5S methodology within an organization has the potential to impact productivity levels. The investigation reveals a substantial correlation between each aspect of the 5S concept and productivity. The 5S technique can be used in any company due to its simplicity and ease of recognition. Although the application's findings are generated rapidly, the long-term deployment within an organization is a complex process.

The 5S approach is a collaborative undertaking rather than a continuous process that requires the establishment of standardized standards and consistent practices to execute long-term implementation strategies to attain corporate objectives effectively. The efficacy of a 5S implementation is contingent upon the organization's ability to maintain up-to-date education and training programs. The research findings and analysis provide the organization with an opportunity to enhance its comprehension of the subject matter. This study can serve as a framework for improving organizational efficiency by utilizing the 5S methodology to identify and address faults and flaws. To optimize productivity, the organization should prioritize effectively categorizing essential and non-essential items within the production line. Increased segregation of things leads to greater availability of space and enhanced workflow, resulting in heightened productivity.

Furthermore, it is advisable for the company to consistently uphold appropriate operational protocols and conduct regular audits of the work environment using the 5S concept to establish a habitual and ingrained organizational culture. When performing a routine audit, it is possible to identify areas that require improvement by highlighting the flaws and errors that are discovered. The effectiveness of this approach is contingent

upon the implementation of appropriate measures, resulting in a notable enhancement in productivity.

REFERENCES

Aadithya, B., Asokan, P., & Vinodh, S. (2023). Lean manufacturing in fabrication industry: literature review and framework proposal. International Journal of Quality & Reliability Management, 40(6), 1485-1517.

Abbas, A., Akram, M. W., & Khan, I. A. (2022). Nexus between Advertising and Consumer Purchase Decision: Study of Punjab, Pakistan. Journal of Managerial Sciences, 16(3), 17-29.

Abbas, A., Khan, I. A., & Akram, M. W. (2022). NEXUS BETWEEN JOB SATISFACTION AND MOTIVATIONAL FACTORS: INTRINSIC, EXTRINSIC AND GENERAL MOTIVATION. JOURNAL OF SOCIAL SCIENCES DEVELOPMENT, 1(2), 102-111.

Abdullah, M., Abbas, A., Khan, I. A., & Akram, M. W. (2022). Impact of work-holism and Destructive leadership on Creativity, Emotional Exhaustion, and Intrinsic Motivation in the Banking Sector of Pakistan. NICE Research Journal, 87-111.

Abimbola, B., Ekpudu, J., & Kuye, O. (2021). Contributions and theoretical approach to total quality management. UNILAG Journal of Business, 7(2), 1-13.

Abu Bakar, N., Rosbi, S., Abu Bakar, A., Che Arshad, N., Abd Aziz, N., & Uzaki, K. (2019). Framework of 5S quality management for university ecosystem to achieve green campus. International journal of scientific research and management, 7(12), 1-9.

Akram, M. W., Abbas, A., & Khan, I. A. (2022). Effects of Perceived Value, Service Quality and Customer Trust in Home Delivery Service Staff on Customer Satisfaction: Evidence from Pakistan. International Journal of Management Research and Emerging Sciences, 12(4).

Akram, M. W., Khan, I. A., & Abbas, A. (2022). Measuring the Effects of Globalization on Public Purchasing with Mediating Role of Research and Development: Empirical Evidence from Pakistan. Journal of Managerial Sciences, 16(1), 109-130.

Ali, K. S., & Islam, M. A. (2020). Effective Dimension of Leadership Style for Organizational Performance: A Conceptual Study. International Journal of Management, Accounting & Economics, 7(1).

Alzoubi, H. M., In'airat, M., & Ahmed, G. (2022). Investigating the impact of total quality management practices and Six Sigma processes to enhance the quality and reduce the cost of quality: the case of Dubai. International Journal of Business Excellence, 27(1), 94-109.

Awang, Z., Ahmad, J. H., & Zin, N. M. (2010). Modelling job satisfaction and work commitment among lecturers: A case of UiTM Kelantan. Journal of Statistical Modeling and Analytics, 1(2), 45-59.

Bayo-Moriones, A., Bello-Pintado, A., & Merino-Díaz de Cerio, J. (2010). 5S use in manufacturing plants: contextual factors and impact on operating performance. International Journal of Quality & Reliability Management, 27(2), 217-230.

Berhe, H. H. (2022). Application of Kaizen philosophy for enhancing manufacturing industries' performance: exploratory study of Ethiopian chemical industries. International Journal of Quality & Reliability Management, 39(1), 204-235.

Candea, S., & Gabor, M. R. (2023). Effects of Systematically Approach of People Development Programs in Automotive Industry. A Case Study. Economics and

Applied Informatics(1), 26-32.

Costa, C., Ferreira, L. P., Sá, J. C., & Silva, F. (2018). Implementation of 5S methodology in a metalworking company. DAAAM International Scientific Book, 17, 001-012.

Davis, D., & Cosenza, R. M. (2005). Business research for decision making. (No Title).

Dulhai, G. (2008). The 5S strategy for continuous improvement of the manufacturing processes in autocar exhaust. Management and marketing, 3(4), 115-120.

Fornell, C., & Larcker, D. F. (1981). Structural equation models with unobservable variables and measurement error: Algebra and statistics. In: Sage Publications Sage CA: Los Angeles, CA.

Guleria, P., Pathania, A., Sharma, S., & Sá, J. C. (2022). Lean six-sigma implementation in an automobile axle manufacturing industry: A case study. Materials Today: Proceedings, 50, 1739-1746.

Gupta, K. (2022). A review on implementation of 5S for workplace management. Journal of applied research on industrial engineering, 9(3).

Gupta, M., Digalwar, A., Gupta, A., & Goyal, A. (2022). Integrating Theory of Constraints, Lean and Six Sigma: a framework development and its application. Production Planning & Control, 1-24.

Gupta, P., & Mittal, A. (2023). Realising leadership in Indian market by Deming awarded original equipment manufacturing industry through TQM. International Journal of Services and Operations Management, 44(3), 426-441.

Hair, H. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2016). A Primer on Partial Least Squares Structural. Sage.

Hanif, M. S., Batool, F., & Yaseen, H. (2023). Effectiveness of implementation of kaizen 5s and its impact on industry performance. History, 2(02), 100-109.

Haslinda, M., Muliati, S., Miri, A. M., & Rahim, A. (2018). Implementation of 5S in manufacturing industry: a case of foreign workers in Melaka. MATEC web of conferences,

Heizer, J., Render, B., & Munson, C. (2017). Operations management. Pearson Education.

Helmold, M. (2023). 5S Concept in Quality Management. In Virtual and Innovative Quality Management Across the Value Chain: Industry Insights, Case Studies and Best Practices (pp. 113-126). Springer.

Hussain, K., He, Z., Ahmad, N., & Iqbal, M. (2019). Green, lean, six sigma barriers at a glance: a case from the construction sector of Pakistan. Building and Environment, 161, 106225.

Khan, U., & Liu, W. (2023). Does environmental responsible effect human resources management practice on firm effectiveness and green technology innovation? Environmental Science and Pollution Research, 30(13), 36160-36175.

Kobarne, A. R., Gaikwad, V. K., Dhaygude, S. S., & Bhalerao, N. A. (2016). Implementation of '5s' technique in a manufacturing organization: a case study. Scholarly Research Journal For Interdisciplinary Studies, 3(23), 1851-1872.

Kumar, M., & Khan, S. (2023). Post-occupancy assessment of student housing facilities in an educational campus: case study of Visvesvaraya National Institute of Technology Nagpur, India. Archnet-IJAR: International Journal of Architectural Research.

Kumar, N., Hasan, S. S., Srivastava, K., Akhtar, R., Yadav, R. K., & Choubey, V. K. (2022). Lean manufacturing techniques and its implementation: A review. Materials Today: Proceedings, 64, 1188-1192.

Lee, L., Petter, S., Fayard, D., & Robinson, S. (2011). On the use of partial least squares

path modeling in accounting research. International Journal of Accounting Information Systems, 12(4), 305-328.

Lotfi, R., Mostafaeipour, A., Mardani, N., & Mardani, S. (2018). Investigation of wind farm location planning by considering budget constraints. International Journal of Sustainable Energy, 37(8), 799-817.

Makwana, A. D., & Patange, G. S. (2022). Strategic implementation of 5S and its effect on productivity of plastic machinery manufacturing company. Australian Journal of Mechanical Engineering, 20(1), 111-120.

Mikhailovsky, P., Plakhin, A., Ogorodnikova, E., Kochergina, T., Guseva, T., & Selezneva, M. (2020). Lean management tools to improve the production system. Calitatea, 21(176), 65-68.

Minh, N. D. (2023). Toyota's production efficiency improvement management: best practice for productivity evaluation and operation improvement. Journal of Advances in Management Research.

Moi, W. A., & Sing, S. H. (2021). Application of Toyota way incorporating kaizen, Kaikaku and 5S in agricultural sector. International Journal for Research in Applied Science and Engineering Technology, 9(10), 1565-1579.

Nitzl, C. (2016). The use of partial least squares structural equation modelling (PLS-SEM) in management accounting research: Directions for future theory development. Journal of Accounting Literature, 37(1), 19-35.

Obilor, E. I. (2023). Convenience and purposive sampling techniques: Are they the same. International Journal of Innovative Social & Science Education Research, 11(1), 1-7.

Pangestu, A. D., Wibisono, I. B., Hasrini, L. C., & Abyan, M. (2022). Perancangan Lantai Produksi Menggunakan Metode Lean 5S (Studi Kasus: IKM Tas Kulit Dwar Leather Magetan).

Permana, A., Purba, H. H., & Rizkiyah, N. D. (2021). A systematic literature review of Total Quality Management (TQM) implementation in the organization. International Journal of Production Management and Engineering, 9(1), 25-36.

Pituch, K. A., & Stevens, J. P. (2015). Applied multivariate statistics for the social sciences: Analyses with SAS and IBM's SPSS. Routledge.

Polancich, S., & Pilon, B. (2019). The application of the Toyota Production System LEAN 5S methodology in the operating room setting. Nursing Clinics, 54(1), 53-79.

Queiroz, G. A., Alves Junior, P. N., & Costa Melo, I. (2022). Digitalization as an enabler to SMEs implementing lean-green? A systematic review through the topic modelling approach. Sustainability, 14(21), 14089.

Riaz, H., & Hassan, A. (2019). Mediating role of organizational creativity between employees' intention in knowledge management process and organizational performance: An empirical study on pharmaceutical employees. Pakistan Journal of Commerce and Social Sciences (PJCSS), 13(3), 635-655.

Seddik, K. (2019). The impact of 5S strategy on the safety climate & productivity at Egyptian garment firms (assembly plants). Open Journal of Business and Management, 7(2), 1072-1087.

Shahbaz, M. S., & Shaikh, F. A. (2019). Impact of lean management practices on operational performance: An empirical investigation from construction supply chain of Pakistan. International Journal of Sustainable Construction Engineering and Technology, 10(2), 85-92.

Shahriar, M., Parvez, M., Islam, M., & Talapatra, S. (2022). Implementation of 5S in a plastic bag manufacturing industry: a case study. Cleaner Engineering and

Technology, 8, 100488.

Singh, A., & Ahuja, I. S. (2014). Evaluating the impact of 5S methodology on manufacturing performance. International journal of business continuity and risk management, 5(4), 272-305.

Statista. (2023). Pakistan - GDP distribution across economic sectors 2022 | Statista. https://www.statista.com/statistics/383256/pakistan-gdp-distribution-across-economic-sectors/

Tabachnick, B. A., & Fidell, L. S. (2007). Using Multivariate Statistics Pearson Education.

Todorovic, M., & Cupic, M. (2017). How does 5s implementation affect company performance? A case study applied to a subsidiary of a rubber goods manufacturer from Serbia. Engineering Economics, 28(3), 311-322.

Tripathi, V., Chattopadhyaya, S., Mukhopadhyay, A., Saraswat, S., Sharma, S., Li, C., Rajkumar, S., & Georgise, F. B. (2022). A novel smart production management system for the enhancement of industrial sustainability in Industry 4.0. Mathematical Problems in Engineering, 2022.

Vasudevan, A., Hai, S. T., Raman, A., & Chan, A. H. A. (2022). THE EFFECTIVE IMPLEMENTATION OF THE 5S CONCEPT ON THE PERFORMANCE: A CASE STUDY OF A MANUFACTURING COMPANY IN MALAYSIA. International Journal on Global Business Management & Research, 11(1), 26-39.

Wassan, R. K., Khan, M. T., Chandio, G. S., Haider, Y., Sarwar, U., Akbar, A., & Umair, M. (2022). The current status of lean manufacturing in small, medium and large scale manufacturing companies of Karachi, Pakistan. Journal of Applied Engineering Science, 20(3), 707-715.

Yahaya, A. A., & Aldraiweesh, N. (2023). A review about the effectiveness of kaizen 5s in performance evaluation. Dinkum Journal of Economics and Managerial Innovations, 2(05), 311-316.

Yanamandra, R., & Alzoubi, H. M. (2022). Empirical investigation of mediating role of six sigma approach in rationalizing the COQ in service organizations. Operations and Supply Chain Management: An International Journal, 15(1), 122-135.