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Sustainable performance in advance warehousing and quality assurance through SAP: a case of Artistic Milliners

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ABSTRACT

Artistic Milliners is the name of Pakistan's rising textile industry. They started their journey about half a century ago, and now Artistic Milliners have become one of the leading manufacturers and the biggest exporter of household textiles and clothing. Artistic Milliners are most concerned with evaluating the new and unique methods of warehouse management processes. The best aspect of this study is that the essential purpose is to study the old and conventional methods in the field and to fulfil new times. The most challenging job of all these workers, who don't want to adjust, is to create and enforce the techniques. My research project aims to research and apply modernized methods in warehousing management in the current practice of Artistic Milliners. Fundamentally, research is focused on quantitative analysis to recognize the impacts of study variables. The consistency and methodology of the analysis are based on a single case study. Sampling methods are used based on a probabilistic process. All data was obtained from primary sources, and Artistic Milliner's officials collected organized interviews. The finding concludes that Artistic Milliners must implement the new developments for a warehouse management system with the ability to incorporate and develop the production. It will train downstream and upstream workers to boost performance.

Keywords: *Warehousing management, Quality assurance, SAP integration, Sustainable performance, SEM*

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1. Introduction

Artistic Milliners originated as an Embroidery & Trading unit in Karachi, Pakistan, in 1949. They expanded into a weaving enterprise in 1988 and have become vertically integrated with a dedicated and productive crew. With approximately 25,000 spindles and 160 air jets, they have all their apparel services under one roof as of 2019, including spinning, manufacturing, and sewing equipment. They specialize in yarn and textiles, exporting to customers primarily in Asia, Europe, and Africa. Vertically integrated in Pakistan, Artistic Milliners (Private) Limited (AML) is one of the top denim fabric and garment makers and exporters. Operating out of 17 facilities/units in Karachi's Korangi and Landhi areas, they manufacture yarn, denim fabric, and clothing. With sponsors boasting over five decades of expertise in the textile industry, AML places significant emphasis on environmental measures. Their LEED Certified Garment Factory, using 31% less energy, 50% less water, and diverting 95% of waste from landfills, underscores this commitment to sustainability (Baloch & Rashid, 2022; Rashid et al., 2024a).

Their fabric units are also ISO 9000 certified, meeting international quality standards. Numerous academics, consultants, and authors have identified warehouse management strategy as a critical business concern. This study explores challenges within the creative milling sector and proposes improvements to the warehouse management system for enhanced efficiency. Despite substantial corporate investment, efficient storage solutions still need to be discovered, posing significant risks to worker management and workplace safety (Amirah et al., 2024). Additionally, inventory pricing and management errors directly impact performance. Collaborating with Artistic Milliners, the focus is on addressing these warehouse management difficulties, offering insights into space utilization and quality assurance, and adopting an autonomous system (Rashid et al., 2024b) like SAP.

The research aims to evaluate warehouse operations and devise innovative warehousing strategies tailored for milliners. Recommendations for an effective warehouse management plan, implementation of quality assurance procedures, and introduction of SAP ERP are central to enhancing employee efficiency and ease of management. The existing study contends with the following research questions:

1. *What processes and strategies are being developed to monitor Artistic Milliner's supply chain-based techniques?*
2. *What are the advantages and disadvantages of the supply chain management employed by Creative Milliner?*
3. *What opportunities and problems do artistic millers have when controlling supply chain risks?*
4. *How might Creative Milliners improve supply chain risk management by implementing SAP ERP?*
5. *How do they improve the quality of their materials and ensure how to examine them?*

1.1 Significance of the Study

This study can assist supply chain managers in organizing their operations and assessing the interest gap. Additionally, it will benefit producers in complete supply chain management, enhancing their critical skills. The Academy will benefit from referencing this study in their instruction. Furthermore, both domestically and abroad, research and development companies will benefit from this research across various platforms. This study will also provide developers and new start-ups with a thorough understanding. Advanced scholars can also leverage this research to increase their awareness. Moreover, impartial individuals seeking information on supply chain methods can utilize this analysis.

Furthermore, this research provides insights into Quality Assurance processes to ensure products or services meet high standards and foster customer satisfaction, which is crucial for business success. Utilizing SAP, businesses can accelerate operations, enhance digital insights, and simplify IT systems, leading to reduced data redundancy, hardware requirements, and data management expenses while analyzing live data for real-time decision-making.

2. Literature Review

The process by which an individual explains the causes of their action and judgment is known as attribution theory. It aids in identifying some of the factors influencing our behaviour and understanding what motivates us to do certain things. For this report, we must define our main concepts, 'procurement' and 'supply chain management,' as well as the link between them, before moving on to the principal job of this chapter. It serves as a good starting point for this discussion in a paper about the scope and meaning of supply chain management. They point out, as with many others, that there are numerous definitions of SCM in the literature. Several definitions mention coordinating an organization's upstream (supplier) and downstream (customer) relationships to produce higher value for end customers. Other definitions concentrate only on the integrated management of an organization's supply-side connections upstream. The intriguing topic is: How should procurement be defined and thought about in connection to SCM, which is defined in these two ways? They classify this question into four categories: 'traditionalist,' 'relabeling,' 'unionist,' and 'intersections'.

Based on the findings of several existing literature evaluations, it is evident that the SCM literature is theoretically varied and fragmented and draws on a wide variety of fields. (Burgess, 2007) Defining a discipline as "a body of practice that is well supported by occupational groupings that identify with a specific territory of activity" and that has "knowledge transfer and creation infrastructure" (e.g., professional organizations, publications). They examine 100 journal articles randomly and find eight primary disciplines underpinning the P&SCM literature, including marketing, logistics, strategy, sociology, economics, and operations management. These 100 articles were published in 31 journals covering a wide range of professional fields, adding to the disciplinary diversity.

Quality Management is a collection of customer-centric and service-oriented quality improvement approaches. QM was created in Japan and quickly gained popularity. While QM may refer to a set of customer-centred procedures to improve quality and promote process improvement, QM practices are guided by various ideas.

2.1 Deming's Theory

Deming's idea of Total Quality Management is based on fourteen points of management that he identified. He is well-known for his ratio, which states that quality equals the output of work efforts divided by total costs. When a corporation focuses on expenses, the result is that costs rise while quality declines. The four points of Deming's profound knowledge system are as follows:

- It is understanding how the company's procedures and systems work is known as system appreciation.
- Variation Understanding of the variation that is occurring as well as the causes of the variation.
- The understanding of what can be known is known as knowledge theory.
- Psychology Understanding of human nature is known as knowledge.

2.2 Crosby's Theory

Another individual credited with initiating the QM movement is Philip Crosby. He emphasized the case, similar to Deming, that spending money on quality is well spent. Crosby developed his list of fourteen steps to quality improvement based on four quality management absolutes (Management,

2010). Crosby's four absolutes are the following:

- Adherence to specifications is how we define quality.
- The only approach to ensure quality is to prevent it.
- The performance standard for quality is Zero Defects.
- The cost of nonconformity is used to gauge quality.

Crosby's thirteen steps to continual quality improvement are as follows:

- Obtain management's complete commitment.
- Create a team dedicated to improving quality.
- Create measurements for each quality improvement action.
- Calculate the cost of quality and demonstrate how it will help you achieve your goals.
- Supervisors should be trained appropriately.
- Encourage employees to solve problems and keep track of them in issue logs.
- Establish a zero-defects committee and ensure all employees and supervisors know the quality assurance procedures.
- Hold a zero-defects day to demonstrate your company's commitment.
- Goals are set for 30, 60, or 90 days.
- Determine the source of errors and eliminate them from procedures.
- Create an employee incentive program.
- Make a good council and meet regularly.
- Rep is the first step.

2.3 Warehousing Services

The foundation of this study lies in warehouse management systems closely linked to supply chain management (Rashid & Rasheed, 2024). Warehousing plays a crucial role in a well-managed supply chain by facilitating the transfer of raw materials or commodities into the delivery network (Rashid et al., 2024c). Primarily, warehousing focuses on organized architecture, ensuring the delivery of each commodity to its designated location and serving as a potent management tool. Warehouse management systems enhance overall competency by improving firm operations. The primary goal of a warehouse is to provide space and time benefits. Warehouses are categorized into reserve inventory, ripening storage, and buffer stock, addressing various needs. It is widely acknowledged that storage incurs significant expenses, urging the creation of compact warehouses holding fewer items. Researchers emphasize warehouse structure and management principles, believing design plays a crucial role in reducing errors, increasing turnover, and providing high-quality service (Rasheed & Rashid, 2023; Rashid & Rasheed, 2023). Warehouses store materials that are not immediately needed, including half-finished or finished goods that still need to be ready for distribution. This study focuses on operational warehouse performance measurement, requiring periodic examination by warehouse management (Staudt et al., 2015; Rashid et al., 2022a). A warehouse management system may also enhance the visibility of the company's goods, serving as an effective tool for achieving industrial goals. Space layout utilization is a significant focus for warehouses, determined by factors like company size, information flow, commercial clientele, and vehicle availability (Rashid et al., 2023). Warehouse management encounters challenges in technological advancement as new technology is implemented to improve performance efficiency, ultimately speeding up the supply chain process and reducing the chance of material loss (Rashid et al., 2022b).

Supply chain management is one of the most critical aspects of any firm, involving obtaining raw materials from suppliers and delivering them to the end user (Staudt et al., 2015). Warehouses are crucial in providing essential information flows and alerting designated individuals when items run out of stock, thus maintaining re-order levels (Aloini et al., 2021). Technological advancements in warehousing, such as robotic picking and loading, drones, and mobile picking, are essential for achieving the speed and quality associated with large regional warehouses, albeit requiring substantial

investment. Managing warehousing records poses another challenge, given the need to accurately track tagged products and labelled items. Warehousing automation focuses on operational flexibility, replicating real-time dynamics through cloud computing (Hashmi et al., 2021a). Internal and external dynamics, such as equipment failure and customer order returns, significantly impact the manufacturing system's exertion process. Real-time information flow, facilitated by adopting a big data mindset, enables precise calculations, sharing storage capacity, and warehouse goods information, ultimately boosting efficiency (Rashid et al., 2024b). The evolution of technology has completely transformed warehousing management, prompting companies to simplify processes to meet customer expectations for efficiency, particularly in e-commerce order fulfilment (Hashmi et al., 2020a). On-demand storage and fulfilment offer long-term solutions for scaling inventory levels and meeting e-commerce demands within budget constraints, ultimately improving quality over time. Organizations are pushed to change their designs to meet demand, driven by developing and implementing modern warehouse management methodologies such as agile, fast response, and continuous improvement. Introducing an e-commerce platform to a company's logistics, sales, and warehousing departments could lead to a significant revolution (Xiang & Kong, 2019).

2.4 Quality Assurance Services

Quality Control" is defined by ISO (International Organization for Standards) as "the operational procedures and activities utilized to meet the standards for Quality." It is defined as "a system of procedures for creating goods and services at a low cost that suit the needs of customers." According to Bell, typical actions in a QC setting include determining inspection points, developing inspection methods, collecting and analyzing data, and preventing chronic illnesses. In simpler terms, this process aims to prevent undesired changes in the product's quality from occurring. Quality control involves creating awareness of conditions during the manufacturing process, whether before or after any effects have occurred. It measures how effectively the manufacturing process satisfies customer quality standards, providing feedback and control to address quality issues as they arise. Waduge (2010) defines quality control as "a procedure for regulating defects to a desirable level per customer requirements." He explains that the QC system exists because flaws in the process necessitate quality control. Factories use reports to record discovered flaws, allowing Quality Controllers or Supervisors to quickly address issues by consulting these reports.

Additionally, the factory's systems utilize charts and visual diagrams to highlight poor activities or operators, known as "Statistical Quality Control" or "Statistical Process Control." Waduge (2010) defines this process using the three "P"s of quality in business: people, products, and processes. It involves understanding where products are, what is done, and how it is done. Controlling the production process entails providing management with information about ongoing processes and using statistical methods to regulate them.

2.5 Statistical Quality Control

SQC, as outlined by Ross, should incorporate various process control approaches involving analysing a work process or its output using statistical methods like control charts. This systematic approach aids in identifying reasons for differences in arriving materials, machine flaws, and other issues. Ross emphasizes that SQC is a systematic approach to problem-solving. The basic steps of SQC include becoming aware of the issue, identifying the problem, determining its source, executing solutions, and establishing a system to monitor and regulate the gains from fixing the problem. Data gathering on presses is summarized or collected to detect unexpected or undesired features. When collecting data, a representative sample of the population must be supplied. Various statistical tools are utilized in SQC:

Bar graph: A column graph that summarizes and presents facts.

Scatter diagram: Illustrates how a pattern emerges from a relationship.

Histogram: Depicts the data distribution regarding the frequency of occurrences for specific

data values.

Pareto diagram: The most used statistical tool for problem-solving, providing a visual summary of facts to draw attention to the most critical factor.

Quality assurance, defined by the International Organization for Standards (ISO), encompasses all planned and systematic procedures necessary to provide sufficient assurance that an entity will meet quality criteria. The fundamentals of Quality Assurance, according to Mitra (2016), include:

1. The supplier and manufacturer set expectations in advance.
2. Specification of items by the customer.
3. Setting up specifications for goods and overseeing manufacturing based on customer requirements.

Whereas the QA activities are as follows:

1. Creating quality policies within the company.
2. Assigning responsibilities within organizational frameworks.
3. We are implementing procedures to meet the business's requirements.
4. I am meeting workplace requirements.
5. We are maintaining the necessary paperwork to demonstrate the system's operation, maintenance, and achievement of quality.

2.6 Total Quality Management

Total Quality Management (TQM), as described by Oakland (Burgess, 2007), is an approach to enhance an entire organization's competitiveness, effectiveness, and adaptability. It involves planning, organizing, and comprehending each task uniquely tailored to each individual at every level. TQM emphasizes everyone's inclusion in the improvement process.

The significant components of TQM are easily identifiable:

1. Focus on the consumer.
2. Recognize that quality is everyone's responsibility.
3. Solve problems collaboratively in groups.
4. Provide employee education.
5. Base management decisions on facts.
6. Commit to continuous improvement.

The TQM methodology supports "Quality" as a critical business strategy. It has been demonstrated in Japanese management practices that organizational-level quality improvements lead to increased market potential, a shift in workplace culture, and more innovative advancements.

2.7 Acceptable Quality Level

According to Waduge (2010), the Acceptable Quality Level (AQL) is determined by management to achieve the highest economic return for the effort put into achieving the required quality level. Essentially, there must be a balance between the cost of quality and the demand for it, which should be adequate for the required volume at the specified price. The product needs to satisfy the client, meet delivery criteria on time, and maintain an acceptable quality level while producing cheaply. If a product meets these criteria, it is deemed acceptable. Customer satisfaction heavily depends on the garment's initial appearance, which is influenced by the designer's creativity and factors like intricacy, work content, handling, and appearance of fabric trimmings. Long-term factors such as suitability for purpose, preservation of original appearance, and consistency of quality also impact whether a customer chooses another garment with the same label (Hashmi et al., 2020b). As a manufacturer, how reliable are you?

Having SAP in warehousing brings numerous benefits. SAP Warehouse Management streamlines and regulates all warehouse activities, enabling users to manage even the most complex warehouse operations while tracking stock variances and controlling hazardous items. Barcode scanners expedite inventory procedures. Stock transfers and goods receipts can be managed while monitoring inbound and outgoing goods throughout the day. All logistics essential for successful warehousing can be handled, and many time-consuming tasks can be automated, saving time and money. Automation of resource-intensive tasks and bin-level inventory management improves overall warehouse organization and accuracy. Additionally, it provides a visual representation of real locations within the facility.

• Faster Inventory Processes: SAP Warehouse Management utilizes barcode scanners, which can significantly accelerate inventory management. As your inventory operations speed up, employees will have more time to focus on critical duties.

• Accurate Items Tracking: This software solution tracks all goods entering, exiting, or moving within the warehouse. With accurate item locations for outbound shipments, up-to-date stock quantities help eliminate errors that could result in inadequate products and reduce pick and pack time.

• Warehouse Automation: SAP warehouse management automates various time-consuming activities prone to human error. As warehouse accuracy improves, costs decrease, allowing more time for higher-level decision-making and coaching.

• Improved Organization: A warehouse with well-defined product storage containers is less likely to become disorderly and prone to mistakes. When everything is organized, moving pallets carrying various goods becomes considerably more accessible, and items are stored in predetermined areas.

• BW is a model-driven data warehousing software built on the SAP Net Weaver ABAP platform. It gathers, transforms, and stores data generated by SAP and non-SAP applications, making it accessible to third-party software and integrated reporting, business intelligence, and analytics tools.

• SAP BW is a programming platform enabling programmers to design and modify data warehouses, perform data management operations, generate reports, and develop analytics applications. Business users often access SAP through a developer-created application, such as an executive dashboard or a mobile app.

2.7.1 Benefits of having SAP in quality assurance

Quality management is essential to supply chain and logistics tasks and the SAP system. The SAP system is software developed by SAP-SE in Germany to help businesses simplify numerous essential activities. It is completely integrated with other components such as:

- Management of Materials (MM)
- Maintenance of Plants (PM)
- Production Scheduling (PP)

The warehouse, which inspects incoming material as it arrives, and manufacturing operations, where the quality of in-process products is examined during the production process and finished goods are reviewed before they reach the warehouse, require quality control. The SAP module is divided into three sections:

- Planning
- Notification
- Inspection

Your quality department can use the quality planning feature to schedule inspections for items received from suppliers, manufacturing, work in progress, and stock transfers. A quality notice can be used to request that the quality department take action. This might be to look into an internal issue, a problem with vendor products, or a client complaint. The physical inspection of a product using requirements set in quality planning is known as a quality inspection. For the quality management team, SAP delivers several reports. The number of times an item has been in a defect state may be found in the material defects report. The vendor defect report shows the frequency of material failures by a vendor. A quality department can identify suppliers that sell items that often fail inspection by looking through inspection lots for goods receipts.

Having SAP in quality assurance offers several benefits for efficiently managing supply chain and logistics tasks. The SAP system, developed by SAP-SE in Germany, streamlines various critical activities and seamlessly integrates with other components such as Material Management (MM), Plant Maintenance (PM), and Production Scheduling (PP). Quality control is essential in warehouse operations, where incoming materials are inspected, and manufacturing processes, where the quality of in-process and finished products is assessed. The SAP module for quality management comprises three main sections: Planning, Notification, and Inspection. With the quality planning feature, the quality department can schedule inspections for incoming materials from suppliers, work in progress during manufacturing, and stock transfers. Quality notices can be generated to address internal issues, vendor product problems, or customer complaints. Physical inspections of products are conducted based on quality planning specifications, known as quality inspections.

SAP provides various reports for the quality management team. The material defects report reveals how often an item has been defective, while the vendor defect report shows the frequency of failed materials from specific suppliers. Inspection lots for goods receipts help identify suppliers whose items frequently fail inspection, allowing for informed decision-making in supplier management.

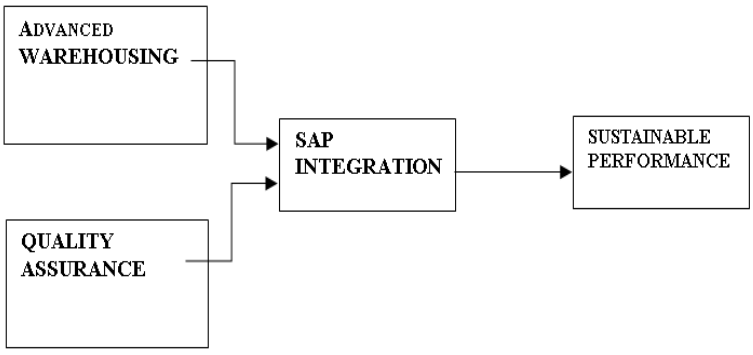

Figure 1: Research Framework

Source: Author's work

3. Methodology

3.1 Case Study Variable One

Today's experts employ logical investigation in their evaluations because it is the most frequently used tool (Khan et al., 2023a; 2023b; Xiang & Kong, 2019). At Artistic Milliners, a thorough investigation will be conducted using a logical investigative approach. While refining a strategy connected to the dispersion focus organization system in the Artistic Milliners Industry, the evaluation identifies problems, obstacles, and defects. It will encompass various levels of concern regarding the affiliation's warehousing tactics and activities. This inquiry will consider an ordered examination of composed and confidential facts and my expert creative receptiveness in this business (Rashid et al., 2020). With the aid of abstract assessment, it is also possible to identify impediments and flaws. We will also examine how ERP will assist this company in ensuring maximum output.

3.2 Case Study Variable Two

The following variable is the sustainability of quality assurance in Artistic Milliners. This research examines studies that have utilized Quality Management methodologies, tools, or practices in combination with sustainable development projects. We have selected four topics that summarize the study on quality management and its application to sustainable development approaches: (I) promoting sustainability through management system integration; (II) promoting quality management as a support for the implementation of environmental management systems and sustainability management; (III) promoting the integration of sustainability considerations into daily work; and (IV) promoting stakeholder management and customer focus. This study also provides recommendations for future research, such as the need to go beyond existing standards and management systems to achieve more radical changes, as well as the need for empirical proof of the impact of integrated management systems on environmental performance. We also emphasize the need to develop and adapt Quality Management processes and technologies to address sustainability issues.

3.3 Approach

In this study, the implementation of warehousing methods in Artistic Milliners was examined using a deductive approach (Hashmi & Mohd, 2020; Rashid, 2016; Rashid et al., 2021). The study contrasted the problems faced by stockroom executives in the production network with business and scholarly literature (Khan et al., 2021; 2022; Agha et al., 2021). Additionally, it investigated how they manage the quality of their products and the challenges they encounter while adhering to the standards and procedures of their company. The study also presents a scenario discussing the potential benefits and approaches they might take when implementing the SAP ERP system. Recently, they signed up with Abacus to implement SAP. The study explored the challenges in the warehouse management system and their strategies for overcoming them.

Primary data collection should commence early in the process as it is more challenging to identify and significantly impacts decision-making. Representatives from medium and large-scale industries, material manufacturers, students of supply chain management, economic organizations, human rights organizations, supply chain experts, apparel manufacturing specialists, consultants, and academic researchers are expected to participate (Rasheed et al., 2023). Since data depends on primary information, secondary data is unnecessary at this stage (Hashmi & Mohd, 2020; Haque et al., 2021). Further, the quantitative research does not pose the trustworthiness issue (Haq et al., 2023).

4. Result Analysis

This chapter uses a Google survey questionnaire to find the best results. It will also ensure that the results are beneficial to the research. SAP field personnel have provided about 80 samples. As a result, I use Smart PLS software to analyse my data through the CFA ratio. The results we find are outer loading (CFA), construct reliability and validity, and discriminant validity (Alrazehi et al., 2021; Das et al., 2021; Hashmi et al., 2021b).

4.1 Validation of the Model

Except for embedded systems, the validation project supported all real-time simulations done by SAP partners. During this period, an assessment methodology was created that was compliant with SAP's concept of validation. Forming a core validation team is critical to the success of validation activities. The team should be active throughout the project lifespan, and all members should know the operational principles being investigated. It is critical to have a uniform assessment and validation methodology. The analytical procedure requires complete traceability of all input and output data. The evaluation and validation methodology should be considered "dynamic" and adaptable to the system's unique needs. The approach must be further developed to increase the quality of the result. A proper validation process should focus on more than just one technique, as with PHARE, which exclusively uses real-time simulations. Other methodologies, like analytical models, fast-time simulators, and so

on, are likely to produce more cost-effective solutions early in a project's development cycle. A validation methodology, rather than an assessment methodology, should be used for future work identical to the SAP software.

4.2 Interpretation of Results

Discriminant and convergent validity are used to measure the model's validity. Convergent and discriminant validity are two approaches to examining construct validity. The degree of agreement utilized to establish the internal consistency of the variable employed in this study is called convergent validity. Loading, AVE, composite reliability, and Cronbach's alpha comprise the convergent validity. The loading value should be higher than 0.5. The AVE must be greater than or equal to 0.5. All of the variables' combined reliability should be better than 0.7. Cronbach's alpha value must be greater than 0.7 (Hashmi et al., 2021b; Rashid et al., 2019). Values are more significant than 0.5, the (AVE) average variance extracted satisfies the criteria by giving values greater than 0.5, the composite reliability value is more significant than 0.7 (Rashid & Rasheed, 2022; Rashid & Amirah, 2017), and Cronbach's alpha is more significant than 0.76, all of which satisfy the convergent validity criteria. The square root of the diagonal values of elements AW and QA is 0.796, and QA is 0.678 greater than off-diagonal values vertically and horizontally; the oblique value of element 1.000, which shows that the diagonal value is more significant than off-diagonal (shows disagreement) values vertically and horizontally; and the oblique value of element SP is 0.859, which is the same as it is. All constructs have been found to have discriminant validity (Hashmi, 2022; 2023).

To find the proportional variance of my data and to configure sustainability, we take out the R-square. We can determine if we acquire SAP, what the output will be, and what its significance will be. The value of implementing SAP is R=0.537. The value should be 0 to 1. The fitness of an independent variable has a positive impact on dependent variables. For the strength of each predictor, we use F-square. By this, we get that advance warehousing has significance with a value of R = 0.271 in SAP integration and R = 0.686 for sustainable performance. In quality, it did not show a significant effect with a value of R = 0.019 with the integration of SAP, and for sustainable performance, it is 0.009. It shows none of the impact, which means that predictors of quality assurance do not affect sustainable performance.

4.2.1 Indirect affect interpretation

Now, we will see the impact of the mediator on independent variables. For that, we analyze the indirect values. For advance warehousing, it is C' = 0.082, which means that it positively impacts the dependent variable, which is SAP integration. The value of C = 0.022 for quality assurance also positively impacts the dependent variable.

4.2.2 Interpretation hetero-trait-monotrait ratio (HTMT)

Table 1: Heterotrait-Monotrait Ratio (HTMT)

	Advance Warehousing	Quality Assurance	Sap Integration	Sustainable Performance
Advance Warehousing				
Quality Assurance	0.771			
Sap Integration	0.751	0.618		
Sustainable Performance	1.000	0.759	0.777	

Source: SmartPLS output

Now, we determine the discriminant validity of our variables, and for this, we use HTMT values, as you can see in Table 1. Discriminant validity refers to the statistical differences between two latent variables that reflect distinct theoretical conceptions. The value of HTMT = (0.771, 0.751, 1.000) shows. It shows that working on warehousing advancement will improve the construct sustainability, and if we use a mediator while advancing, SAP implementation value HTMT = 0.618 shows significant

improvement.

4.2 3 Interpretation of inner and outer VIF values

Table 2: Collinearity Statistics (VIF)

	VIF
AW10	2.611
AW12	2.359
AW3	2.836
AW4	3.141
AW5	3.676
AW6	4.062
AW7	2.655
AW8	1.818
AW9	2.565
QA1	2.328
QA10	1.958
QA3	2.628
QA4	2.488
QA5	2.528
QA6	2.148
QA7	1.799
SI1	1.000
SP1	1.753
SP2	2.049
SP3	1.828

Source: SmartPLS output

Table 3 Inner VIF Values (correction)

	Advance Warehousing	Quality Assurance	Sap Integration	Sustainable Performance
Advance Warehousing			2.851	3.623
Quality Assurance			2.851	2.906
Sap Integration				2.158

Source: SmartPLS output

To understand the high multicollinearity issue, we use VIF values. It tells us if variables are related to each other or not, resulting in incorrect and unstable regression coefficient estimations. As you can see in Tables 2 and 3, the outer value shows individually high multicollinearity in variables, which is not above 3. It shows us that questions are not related to each other. Each question specifies other and all fields of independent variables. This relates to variables of dependent values. Inner values are also less than 3, which shows the inner high multicollinearity is equally distributed in all variables.

Table 4 Model Fit (Fit Summary) (correction)

	Saturated Model	Estimated Model
SUMMER	0.113	0.113
d_ULS	2.685	2.685
d_G	1.143	1.143
Chi-Square	423.685	423.685
NFI	0.675	0.675

Source: SmartPLS output

Table 4 shows the overall summary of the model. This shows how much the model fits while implementing the entire variable.

4.3 Diagram Hypothesis Testing (correction)

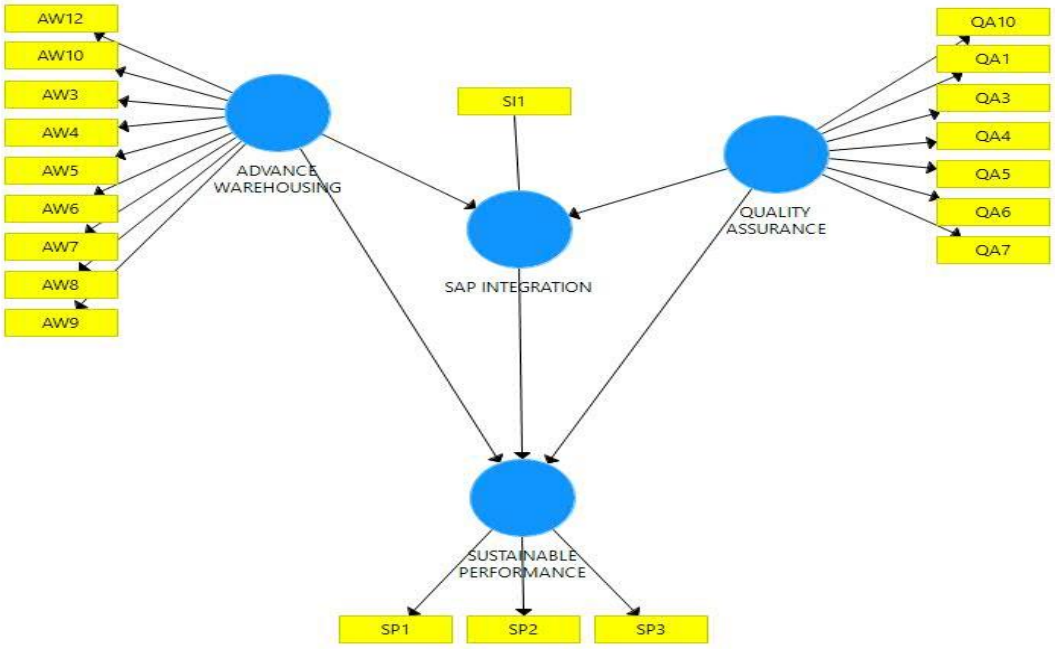

Figure 2: SEM analysis

Source: Author's work

Complete Figure 2 of variables interconnected with independent and dependent variables along the mediator. Figure 2 illustrates the SEM analysis.

4.4 Hypothesis through Direct Effects

Table 5: Direct Effect

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
ADVANCE WAREHOUSING -> SAP INTEGRATION	0.598	0.591	0.147	4.082	0.000
ADVANCE WAREHOUSING -> SUSTAINABLE PERFORMANCE	0.721	0.697	0.111	6.470	0.000
QUALITY ASSURANCE -> SAP INTEGRATION	0.159	0.154	0.145	1.094	0.274
QUALITY ASSURANCE -> SUSTAINABLE PERFORMANCE	0.076	0.095	0.089	0.855	0.393
SAP INTEGRATION -> SUSTAINABLE PERFORMANCE	0.138	0.144	0.094	1.471	0.004

Source: SmartPLS output

Direct effects mean the impacts of independent variables on dependent results. In Table 5, we can see that all warehousing variables have a direct impact on the end dependent variable. It shows that if a company implements SAP or not if they work on their warehousing implementations, they can improve their results significantly. The p-value for warehousing is (p=0.000), and for sustainable performance is (p=0.004). Although the quality effect is less on sap integration. There are many reasons, but a possible reason is that the company works less on quality inspections or has yet to move on to greenhouse effect assurance for quality management.

4.5 Hypothesis Through Indirect Effects

Table 6: Indirect Effect

	Original Sample	Sample Mean (M)	Standard Deviation	T Statistics (|O/STDEV|)	P Values

	(O)		(STDEV)		
ADVANCE WAREHOUSING -> SAP INTEGRATION					
ADVANCE WAREHOUSING -> SUSTAINABLE PERFORMANCE	0.082	0.090	0.071	1.157	0.002
QUALITY ASSURANCE -> SAP INTEGRATION					
QUALITY ASSURANCE -> SUSTAINABLE PERFORMANCE	0.022	0.020	0.026	0.847	0.397
SAP INTEGRATION -> SUSTAINABLE PERFORMANCE					

Source: SmartPLS output

Table 6 shows that when we look at the indirect effects on dependent value, it clearly shows that warehousing positively affects sustainable performance. The p-value is (p=0.002). That means that if we deploy SAP, it will be more beneficial for them. What is not indirect is quality assurance. Quality assurance did not help with sustainable performance. The p-value is more significant than 0.005, which is (p=0.397).

5. Conclusion, Discussion, Implications, Limitations, and Recommendations

The measurement, monitoring, and disclosure of organizational performance towards the objective of sustainable development are all covered by SAP Sustainability Performance Management. You may use SAP Sustainability Performance Management as a centralised or distributed localized application to monitor your company's environmental, social, and economic performance. Connect your company's operations, employees, and products with set sustainability objectives and criteria. The solution is designed to integrate with different SAP and non-SAP systems in a heterogeneous context. It may be installed without requiring any changes to your current logistical procedures. My findings and research will cover all the downstream and upstream flaws and give a conclusion and recommendation on what to do further with the help of SAP, which will help the corporation upgrade its employees and improve its efficiency and effectiveness.

5.1 Conclusion

All of the information we gathered from the department heads of Artistic Milliners, as I indicated in Chapter 4, Artistic Milliners was found to produce highly successfully with the most significant number of production locations. However, I have uncovered several flaws in this reality that must be evaluated separately. To begin with, the self-employed and upstream employees might strengthen and polish their abilities by preparing for their prospective employment downstream. They're still trying to figure out their extensive warehouse inventories. As a result, they decided to push the trigger ahead and take action on their own to bring about the extreme shift. SAP's benefit to businesses comes in various forms. Typically, the primary aim is to achieve quantifiable results, such as increased revenues, lower expenses, or higher rates of return on investment. SAP S/4HANA will also provide a platform for innovation and development and the ability to mitigate risks and satisfy increasing regulatory needs.

5.2 Discussion

Artistic Milliners is a leading fabric maker in Pakistan. They are the market leader in the textile business, so streamlining all operating output to meet market leader standards is a challenging feat. The only reason why artists embrace artistic milliners abroad and stick to their norms is because they never compromise on their essential ideals and beliefs. This is one of the most important factors. I felt uncomfortable sharing critical facts about my research method during the initial interview session. However, for the time being, interviews are the most engaging component. As a result, high management has permitted me to undertake research and conduct multiple interviews. The warehouse department's leader is actively involved and offers as much information as possible. The warehouse

management system's present organized procedures and processes are well-managed, but they're seeking an out-of-field mechanism that they've opted to change and impact technology. Artistic Milliners evaluated it for the company's overall growth. They focus primarily on staff preparation, while downstream employees will support the change they desire. As a result, they initially assembled a strategic team dedicated to R&D, planning, and the breakdowns encountered along the complete implication process. They place a greater emphasis on modernizing their present equipment with new technological instruments to manage their storage structure, as well as training their unskilled workers to boost their productivity and performance. From the management perspective, they are devising an extrinsic incentive and an underlying reward to boost the morale of employees directly or indirectly associated with the strategic team. By simply seeking the aim, artistic milliners provide their workers equal rights and resources for their skills. They are primarily concerned with the warehouse management system's flexibility to adapt to new and distinctive methodologies. Artistic Milliners is likewise dedicated to maintaining a high level of quality and polishing to the defined standard. Furthermore, incorporating new ideas is one of the most challenging aspects of managing artistic milliners. The transfer will be carried out smoothly after assembling the strategic team from every creative Milliner's department. According to the interviews, creative Milliner has an unsustainable departure from human resources, which is linked openly or implicitly to why the change is not authorized. Artistic Milliners is the name of the commitment, and they have a great potential to satisfy their customers' demands, so they design the layout for their potential customers from their primary customer by listing their demands, standards, and various parameters and providing a quality product to instil the right will in their customers' minds. The customer's demands may be met with better and more efficient warehouse framing work. Technical influence is the leading solution to modern issues requiring a current response. Take advantage of this opportunity to receive an upgraded and advanced warehouse management module from Artistic Milliners. They could comprehend the loopholes discovered at various times but were concerned about taking risks and lowering the risk element. The number of artistic milliners will continue to rise as productivity, high-quality equipment, and quality management distinguish artistic milliners, giving the company a competitive advantage. Artistic Milliners also produces high-quality textile machines for home use. Experts say home textiles are one of the most essential contributions to the global economy and industrial process (De Andrade & Bizzo, 2019). Artistic Milliners plans to reengineer the system in some divisions to produce the company's latest technical advancement. The main focus is developing fresh warehouse management approaches and using current procedures. Evaluating new approaches necessitates a more efficient and effective storage mechanism. It reduces the risk of inventory mishandling, increases worker accuracy and efficiency, and reduces order processing time. The most challenging task is evaluating and applying the various warehouse control tools. However, drastic change is essential to preserve the industry, which can quickly innovate the market for artistic milliners in the existing market. By the implementation, Artistic Milliners shall contact one of Pakistan's enterprises by the implementation process, which is undertaking a significant shift to turn things around.

5.3 Implications

They agree to suggest the most recent and updated facilities because the new hardware in their warehouse management system is not aligned. They decided to set guidelines for the new warehouse management system methods, such as Artistic Milliners. It is necessary to evaluate the functional region's increased relevance. Because their demand graph is constantly growing, artistic milliners can create future benefits based on cost research. They seek to collaborate with customers and vendors to continually develop and enhance manufacturing strategies. In this regard, they would establish a planning committee to closely monitor their employees' evaluations and preparations to boost their revenues swiftly.

5.4 Limitations and Recommendations

One of the critical constraints was that only the warehouse department's chief could conduct detailed interviews. Although adding production and inventory control personnel to my study project would be highly beneficial, Artistic Milliners is a renowned textile company in Pakistan. They must

also offer their rudimentary knowledge. They typically cease discussing prospective priorities and goals in terms of methods and timeframes, and they don't show any of the actual facts.

In response to the proposal, because I know that artistic milliners have critical challenges in managing their trash, they should establish specific ecologically friendly policies and processes to help prevent negative repercussions. Regarding technical advancement, Artistic Milliners may have some expertise in warehouse operations. They demand further training from their staff, which has needed to be faster to adapt to contemporary machinery and technology. Companies that produce artistic milliners must establish strategic management that addresses issues related to newly emerging processes. All textile enterprises in Pakistan will quickly acquire a competitive advantage based on the above guidelines, recommendations, and guidance from creative millers. This enhances the output of innovative millers in order to meet consumers' quotas. SAP Business Scenario Recommendations for SAP help businesses discover areas in their system that might be simplified to improve overall performance, such as finance, sales, supply chain, procurement, manufacturing, and asset management. The most critical applications and extensions for achieving corporate goals, as well as data that demonstrates the precise ways that upgrading to SAP will benefit operations, are included in the recommendations. Finance, sales, supply chain, procurement, manufacturing, and asset management are all areas where SAP Business Scenario Recommendations may help firms simplify their systems to enhance overall performance. The suggestions contain data that indicates the specific ways that upgrading to SAP can help operations, as well as the most relevant apps and extensions for accomplishing company goals.

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