

# Factors Influencing Lean Methodology Application at Phaswana Textile and Manufacturing

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## Keywords

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## Abstract

The South African government advocates that all products used in the country should be locally manufactured. With the manufacturing industry thus increasing, companies are facing challenges. This study focuses on Phaswana Textile and Manufacturing, a company operating in Westonaria, Johannesburg, attempting to establish a footprint in the local manufacturing industry. The company primarily manufactures personal protective equipment (PPE), corporate uniforms and hospital scrubs. The implementation of Lean methodology is examined in a case study at this company to investigate how its operational efficiency can be enhanced by implementing such a methodology. A qualitative study was used to acquire data collected through interviews with the staff who agreed to participate in this study. The interviews helped the researchers acquire information about the company's current manufacturing process and other challenges. The findings showed that the company is challenged by wastage of material, long lead times, unmanaged manufacturing processes, and long idling times. The findings also indicated that no Lean methodologies were implemented in this organisation. The study recommends the company's management train its employees, build a waste- management culture, and align the Just in Time principles with the strategic objectives of Lean.

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# **1. Introduction**

Lean strategy was developed at the Toyota Motor Company in the 1950s by Taiichi Ohno with the vision of systematically identifying and eradicating waste from production processes and involves changing and improving these processes (Rahman, Laosirihongthong and Sohal, 2010). The textile and clothing industry in South Africa has been struggling to increase the efficiency of most of its operations by reducing cost and wastage. This struggle is caused by the expensive technology required to increase efficiency in a highly dynamic industry and intense local and international competition (Miller and Chalapati, 2015). The management of Phaswana Textile and Manufacturing, a South African textile and clothing organisation, is contemplating the implementation of a Lean manufacturing methodology. This research investigates where and how Lean approaches are most needed in the organisation to improve operational efficiency and how implementing a Lean approach thus far has increased performance. A supported view states that Lean methodology has emerged as a powerful approach for organisations in developing nations to improve their business performance (Maware and Adetunji, 2019).

## **1.1. Problem Statement**

Phaswana Textile and Manufacturing has been battling to contain high operational costs, improve delivery time, reduce waste in its manufacturing processes and increase the efficiency of its operations. Guercini, Becagli and Ranfagni (2017) explain that South African textile and clothing manufacturers are under immense pressure as a result of globalisation, cheap imports, and various changing customer needs, which require them to keep abreast of change and adopt the best business practices to survive. According to Onwughalu et al. (2017), modern organisations are faced with the crucial task of focusing on the quality of their products and ensuring that their customers are satisfied. With globalisation, the Coronavirus pandemic, a highly dynamic industry and the intense competition in the South African textile and clothing industry, most organisations are being coerced to seek alternative ways of being cost-effective, increasing product quality and satisfying the dynamic needs of customers (Onwughalu et al., 2017). Phaswana Textile and Manufacturing has not been immune to the impact of the Covid-19 pandemic, economic challenges, and competition. In addition, because of the highly competitive environment in which the organisation operates, in which larger manufacturing organisations dominate, the organisation is attempting to implement lean thinking and ways of operating in its own environment. Despite the widespread adoption of lean manufacturing, there is growing concern regarding the application of lean in both small and large businesses. Phaswana Textile and Manufacturing seeks to improve its operational efficiency, maintain a competitive edge, reduce order-cycle times and offer the best affordable prices in the market by applying the lean methodology in its operations. According to Maware and Adetunji (2019), the effects of lean practices on the operational efficiency of organisations are under-investigated in Southern Africa. With this in mind, this research seeks to study the

implementation of lean methodology to enhance operational efficiency at Phaswana Textile and Manufacturing. Therefore, the core problem being investigated in this study is that the factors that influence the adoption of Lean in this specific company are unclear.

## **1.2. Background, Rationale and Value of the Study**

The clothing and textile industry has existed for more than a hundred years in South Africa and has been competitive enough to withstand international competitive pressure (Chiromo and Nel, 2020). The business environment worldwide is made up of cutthroat competition, with the life span of products and services becoming shorter, which renders the South African business environment volatile (Lang and Hugge, 1995). Over the past two decades, South African organisations have struggled with slow economic growth, an increasing inflation rate, and the Rand (local currency) weakening against other highly performing currencies. These factors cause people to have less disposable income (Rahman, Laosirihongthong and Sohal, 2010).

Additionally, the Covid-19 pandemic that emerged in 2019 is identified as a challenge that is currently haunting businesses through imposed national lockdowns, restrictions on the movement of people, social distancing, and the increased need for conducting business virtually (Hodkinson et al., 2020). Numerous jobs were lost due to the pandemic, with businesses losing revenue because of imposed lockdowns. In the face of these modern challenges, managing organisations requires adopting and implementing practices and techniques to maintain appropriate performance levels that can contribute to the organisations' bottom line (Onwughalu et al., 2017).

Organisations are compelled by the challenges they face to adopt production processes that involve flexibility, lower operational costs, and reduce the wastage of human and non-human resources to operate effectively (Schmidt, 2011). The organisation's operational efficiency is one way to assess management, employees and performance. The design and application of Lean production are crucial for high-level value production, and it is considered an indispensable characteristic of a successful manufacturing venture, as stated by Pearce and Pons (2013). It is acknowledged that Lean production is beneficial and essential in manufacturing organisations; however, implementing Lean is challenging and only sometimes successful, according to Emiliani (2006). Furthermore, Holweg (2006) suggests that change acceptance and management have reportedly impacted the implementation of Lean in various organisations. This impact suggests that adopting the Lean methodology by organisations such as Phaswana Textile and Manufacturing requires making specific decisions. The results have a risk element that could lead to success or failure as the process requires the commitment of management and employees and proper change management. The study intends to make recommendations to the company that will lead to the practical applications of Lean methodologies should the findings point in such a direction.

### **1.3. Research Aim, Objectives and Questions**

#### **1.3.1. Research Aim**

The study aims to investigate the factors influencing the implementation of lean manufacturing practices at Phaswana Textile and Manufacturing, intended to enhance operational efficiency, improve production processes, and make recommendations accordingly.

#### **1.3.2. Research Objectives**

The main research objective is to identify the factors influencing the application of Lean methodology at Phaswana Textile and Manufacturing. From the primary research objective, the following specific research objectives, referred to as SRO, were developed by the researchers:

- SRO<sub>1</sub>: To determine how lean methodology factors influence the implementation of the methodology at Phaswana Textile and Manufacturing.
- SRO<sub>2</sub>: To determine the impact of Lean Methodology factors on operational efficiency at Phaswana Textile and Manufacturing.
- SRO<sub>3</sub>: To recommend engaging with the above factors while implementing Lean Methodology at Phaswana Textile and Manufacturing.

#### **1.3.3. Research Questions**

From the above main research objective, the following main research question was developed: What factors influence the application of Lean Methodology at Phaswana Textile and Manufacturing?

The following specific research questions, referred to as SRQ for the purpose of this study, were formulated:

- SRQ<sub>1</sub>: How are the Lean Methodology factors influencing the methodology's implementation at Phaswana Textile and Manufacturing?
- SRQ<sub>2</sub>: How do Lean Methodology factors impact operational efficiency at Phaswana Textile and Manufacturing?
- SRQ<sub>3</sub>: What recommendation can be made from this study's investigation?

### **1.4. Scope and Limitations of the Study**

This study is confined to Phaswana Textile and Manufacturing, a Westonaria, South Africa company. Through the qualitative research design, the study's data has been obtained from the employees of the organisation under study. No other organisations in the South African textile and manufacturing industry are included.

The findings of the study are subject to the limitations mentioned earlier. At the time of the study, the organisation had only 16 employees. The study aimed to obtain data about the impact of Lean methodology on the operational efficiency of such a business. In addition, the data collection was

subject to strict Covid-19 prevention regulations, which encouraged social distancing. The findings of the study, limited to one organisation, may not be generalised.

### **1.5. Background of the Company under Study**

Phaswana Textile and Manufacturing is a company owned by a young female with a BTech degree: Management Services from the University of Johannesburg. The company had been operating for a few years before officially registering in February 2021. The owner financed the company to acquire assets and establish a clothing factory at its inception stage. The company currently has over 20 sewing machines used to perform various activities in the garment-manufacturing process. Phaswana Textile and Manufacturing is a company that manufactures garments, personal protective equipment (PPE), corporate bags and office uniforms, among other products. The organisation is based in the heart of Westonaria in Gauteng Province, and its major clients include the mines (South Deep Mine and Sibanye Still Waters) situated in Westonaria. Phaswana Textile and Manufacturing has 16 permanent employees, including the organisation's owner. This company competes with large companies in the manufacturing industry as it is one of the only female youth-owned manufacturing companies on the West Rand.

Phaswana Textile and Manufacturing is not yet accredited with the South African Bureau of Standards (SABS) or any other certified accreditation body but has registered to be accredited with SABS and with Select PPE. This organisation has a well-established factory in Westonaria, where the manufacturing process starts with receiving a customer's order, after which sample material is sourced and a sample manufactured to be approved by the customer. Upon approval of the sample, the customer's order is manufactured, and the clothes go through a cleaning and quality-check process before being delivered to the client. While the process of manufacturing a garment may seem reasonably uncomplicated, the current operational process of the organisation is producing unsatisfactory results, with problems such as wastage of cut material, long lead times, defective garments and customers expressing dissatisfaction with the quality of the garments.

## **2. Literature Review**

### **2.1 Gap Analysis**

Existing literature on factors impacting the implementation of Lean Methodology stretches across multiple industries. It is essential to establish what the literature already covers to establish the context of this present research. To conduct the literature gap analysis, the researchers applied inclusion and exclusion criteria adapted from research by Mukwakungu, Mabasa and Mbohwa (2018). The considered criteria were: (1) studies published between 2017 and 2023, (2) studies investigating problems around Lean Methodology Implementation Factors, (3) studies published in journals indexed in Scopus, ScienceDirect, Emerald, IEEE Xplore and SpringerLink and (4) no review of the literature by other authors. Relevant studies that have been selected to guide this research are shown in Table 1 below:

**Table 1: Literature Gap**

Ref	Context of the study	Where
Cadden et al. (2020)	This research examines how Organisational Culture (OC) affects Lean Practises (LPs) and Operational Performance (OP) in 295 UK firms.	UK, Europe.
Aytekin et al. (2023)	The research assesses and picks the top Critical Business Process (CBP) in Istanbul food enterprises with corporate identity using LSS performance metrics.	Turkey, Europe
Arlinghaus and Knizkov (2020)	This study examines lean management in automobile maintenance and repair operations.	Germany, Europe
Grassi et al. (2020)	Lean methods is used to redesign an ophthalmology clinic to enhance intravitral injection management.	Italy, Europe
Siphoro et al. (2020)	This study evaluates lean manufacturing 4.0 and quality 4.0 in a South African FMCG packaging company to reduce waste.	South Africa
Thobakgale et al. (2022)	This study examines how lean manufacturing, the 5S Lean technique, Kaizen, Just in Time, and value-added management may reduce waste.	South Africa
M. Durai Aravindh et al. (2023)	The research examines how alliance agreement and lean techniques synergize to improve construction project execution.	India, Asia
Sharma et al. (2023)	The research examines lean frozen section processing at a big cancer center.	India, Asia
Korchagin et al. (2022)	Lean Maintenance 4.0 is utilized in aviation maintenance systems to improve efficiency.	Russia, Europe
Habib, Rizvan and Ahmed (2023)	A Bangladeshi labelling and packaging firm implements lean manufacturing using value stream mapping (VSM) to increase performance.	Bangladesh, Asia
Chandan, Kanchan and Rajenthirakumar (2022)	An Indian IT giant uses DMADV to produce a market-penetration product.	India, Asia
Feinman et al. (2022)	LEAN is introduced to surgical residents to improve rounding efficiency.	USA, America
Aslam, Gao and Smith (2020)	After a systematic literature analysis, the authors performed a questionnaire survey to determine lean tool and method success factors.	Pakistan, Asia
Elkhairi, Fedouaki and Alami (2019)	This research study identifies Lean Manufacturing hurdles and CSFs for SMEs.	Bangladesh, Asia

## 2.2 Lean Methodology Factors

Implementing Lean production is ideally influenced by human capital management in the successful application of the Lean methodology in organisations is influenced by several variables (Onwughalu et al., 2017). Factors that can positively or negatively impact Lean implementation in organisations include organisational culture, communication, availability of resources, and management support and commitment. These factors are explained below.

### 2.2.1 Organisational Culture

Organisational culture plays a double role in change management. It plays a crucial role for any company that intends to adopt a new method, technique, or system, and it is also cited as a significant constraint in the change process (Onwughalu et al., 2017). When the culture in an organisation is very

supportive of change, teamwork and involvement, changes such as Lean production implementation will be welcomed, as highlighted by Villareal et al. (2012). Businesses need to develop a culture that empowers employees at all levels to be innovative and embrace change that improves efficiency aimed at reducing waste.

### **2.2.2 Human Resources**

Implementing Lean production is ideally influenced by human capital management in the organisation (Taleghani, 2010). The human resources department's role is to train its personnel in the skills they require for Lean thinking; designing the appropriate jobs; building trust and loyalty; and enabling good.

### **2.2.3 Change Management**

The ability of organisations to manage change is critical for ensuring sustainability and the enduring benefits of implementing lean ways of running a business (Pearce and Pons, 2013). Recognising the need for an adequate change-management technique in the direction of Lean execution results from two significant essential points. The first is the investigation of progress or failure of execution measures; the other is the conviction that each instance of lean implementation is novel and requires an individualised approach (Bhasin, 2012).

### **2.2.4 Management Commitment and Support**

The leadership and management of an organisation that intends to implement lean methodology must support its implementation, from the shared vision to the physical and non-physical resources required to implement lean (Onwughalu et al., 2017). The organisation's management is mainly responsible for the supportive, harmonious, togetherness culture ideal for lean implementation, as Emiliani (2006) noted. Furthermore, it is extensively acknowledged that for the fruitful implementation of lean methodologies in an organisation, commitment from all levels of management is crucial (Alefari et al., 2017).

### **2.2.5 Financial and Non-Financial Resources**

Implementing lean methodologies requires a shift from traditional manufacturing processes and ways of doing business in an organisation, which require new strategies, processes, procedures, tools and machinery (Bhasin, 2012). As highlighted by Alefari et al. (2017), it is essential to note that the availability of required resources supports the success of lean implementation. Furthermore, the successful outcomes and resources required include employee training and development; adequate strategic, technical and operational support; and the supply of machinery and all the resources demanded by the new system (Alefari et al., 2017).

To sum up, the factors discussed above, Table 1 below provides a summary of the factors for and against the implementation of lean methodology in organisations, as adapted from a study by Jedynek (2015).

**Table 2: Factors Influencing the Implementation of Lean Manufacturing**

<b>Supporting Factors</b>	<b>Hindering Factors</b>
Effective and efficient communication	Inadequate financial and non-financial resources.
Quicker and effective decision making	Reliance on outdated labour-intensive technologies and management practices
Change management and flexibility	Resistance to change from management and employees
Responsiveness to customer needs	Shortage of skills and expertise in an organisation
Decentralisation and autonomy of employees	Ineffective one-way communication without feedback or with delayed feedback
Unified organisational culture	Responsive decision making rather than proactive decision making
An innovative environment	Inadequate support and commitment from management

### **3. Research Methodology**

#### **3.1 Research Design and Method**

A research design is an overall strategy in which the researcher integrates a research project's components coherently and logically (Ahmed, 2016). A study can adopt a particular research design from an array of such depending on the aim and objectives of the study. The primary motivation for using a case study as the research design is to acquire comprehensive data that allows an in-depth understanding of the topic, subject, or inquiry. Considering the small study sample and the study's aim of obtaining a comprehensive understanding of the topic, this study adopted a qualitative research design. To enable the researchers to collect data for the case study, interviews were conducted with the target population.

Three main research methods exist: qualitative, quantitative, and mixed (Kothari, 2017). This study adopted and employed the qualitative research method because of the following merits: (1) The qualitative method provides details about human behaviour, emotions, and personal characteristics; (2) It provides more content that can be used in the study; (3) The qualitative method turns individual experiences into usable data; and (4) It uses a fluid operational structure instead of rigid guidelines.

#### **3.2 Population and Sampling**

The target population is an aggregate of elements from which a study sample can be selected (Creswell and Poth, 2018). The target population of the current study comprised all 16 employees of Phaswana Textile and Manufacturing. The total number of employees was obtained from the human resources department at Phaswana Textile and Manufacturing in Westonaria, Gauteng Province, South Africa. The sampling strategy the researcher deployed is an attempted census sample as the researcher



anticipated interviewing all 16 Phaswana Textile and Manufacturing employees due to the small population size. However, the participants who volunteered to participate were only eight as the rest refused to participate in this research study resulting in the volunteer sampling method being deployed. Therefore, data were collected from these participants to conclude the findings of this study.

### **3.3 Data Collection and Analysis**

#### **3.3.1 Data Collection**

The semi-structured interview was used as the research instrument for collecting the primary data for this study. This type of interview was used because it is suitable for collecting data that can be thematically analysed and allows the researcher to probe for more information. The researcher developed an interview guide that acted as a guideline during the interview. The interview guide was divided into sections A and B. Section A contained questions to establish the characteristics of the participants. In contrast, Section B contained questions to investigate the impact of implementing lean methodologies on the organisation's operational efficiency.

The interviews were conducted at the Phaswana Textile and Manufacturing offices following an interview schedule. In the exploration at the company, the focus was in understanding lean practices. The foundational elements of lean manufacturing were sought, along with the strategies employed to reduce waste. Identifying areas for continuous improvement was deemed essential. From an employee's viewpoint, clarity on their roles and any complexities in guidelines was placed scrutiny. The efficiency of current processes was also under examination. The quest for enhancing product quality and insights into the synergy between technological tools and processes were vital elements of the interviews. Financial strategies to boost profitability were also being evaluated, and avenues to improve operational efficiency remained of great interest. Conclusively, perspectives on the potential impact of lean processes on overall efficiency were gathered.

#### **3.3.2 Data Analysis**

Data analysis is the process that researchers used to reduce data to a story and interpret it to derive insights (Brannen and Moss, 2012). Data can be analysed quantitatively or qualitatively. In this study, qualitative data was collected through the abovementioned interviews and analysed qualitatively. Qualitative data analysis includes putting together, representing, clarifying, and exploring the data for the participants' meanings and understanding of the study phenomenon; and noticing consistencies in examples, topics and classifications (Creswell, 2021).

In the current study, the data coding was initiated once the data-collection process was completed. Coding is the primary process for developing themes through identifying items of analytical interest in the data and tagging these with a coding label (ESOMAR, 2019). The analysis included the concentrated perusal of every record and identifying major questions that linked the participants' records of their encounters and perceptions. The data were thematically analysed by determining themes, trends, and

relationships among the research variables. The researcher identified patterns (themes) in the data through thematic analysis and grouped them for analysis. Thematic analysis is a straightforward, flexible, and accessible approach (Creswell and Poth, 2018).

### **3.3.3 Trustworthiness of the Data**

According to Kawulich (2004), trustworthiness is the degree to which confidence can be expressed about the data, interpretation and methods used to ensure the quality of the study. In addition, Collis and Hussey (2014) observe that researchers must adhere to the necessary guidelines and procedures to ensure that the research community recognises their studies as credible. To ensure the trustworthiness of the study, the researcher conformed to the following standards:

#### **3.3.3.1 Credibility**

According to Saunders, Lewis and Thornhill (2019), credibility is the assurance of the genuineness of the study. To warrant credibility, the researcher was transparent when it came to all the steps and procedures used in the research by ensuring that all selected participants who wished to be part of the study signed a consent form that consisted of an explanation about the study and its significance and how the participants' responses would help the study. There was also an interview guide approved by the research ethics committee of the University of Johannesburg that was used to ensure that all participants were interviewed in the same way. Additionally, the participants' answers were recorded in writing and through a voice-recording device to ensure that all answers were recorded correctly.

#### **3.3.3.2 Transferability**

The degree to which the findings of a study can be applied to another situation with another population (Creswell and Poth, 2018). A comprehensive and vigorous account of how the primary data was collected was articulated to warrant transferability.

#### **3.3.3.3 Dependability**

Denscombe (2017) defines dependability as a standard used to establish whether the results of a study are dependable and can be repeated. A thorough and rigorous examination was conducted to ensure that data supported the conclusions drawn from the study.

#### **3.3.3.4 Conformability**

The neutrality of the research processes during data collection and analysis (Somekh and Lewin, 2011). Conformability was improved by incorporating the participants' voices. In addition, the research data collection and analysis were conducted using standard methods that enabled the aim and objectives of the study to be answered.

### **3.4 Ethical Considerations**

According to Du Plessis (2014), ethical considerations are crucial in research to ensure that information about participants' perspectives is provided freely and without hesitation and that the study does not hurt or violate the rights of the participants. Ethical considerations involve permission to conduct the study, informed consent, anonymity and confidentiality (Somekh and Lewin, 2011). These considerations are discussed in more detail below.

- **Permission to conduct research.**

Permission to conduct a study on implementing lean methodology to improve operational efficiency at Phaswana Textile and Manufacturing was requested and obtained from the management of the company and the University of Johannesburg through the research ethics committee. The University of Johannesburg issued an ethical clearance certificate with ethics number UJ\_FEBC\_FEPC\_00495 to conduct the study.

- **Informed consent**

Before the data collection, the informed consent form was handed to each participant, who was asked to read and sign it. The study's goal and the procedure for gathering data were both clearly stated in the informed consent form. The form also stated that participants' involvement was optional and that they might end it at any point if it made them uncomfortable.

- **Anonymity**

According to Dougherty (2021), providing anonymity and confidentiality to participants enables researchers to collect solid qualitative evidence on sensitive subjects. To maintain anonymity, the interviewing guide was developed to not ask participants for personal information.

- **Confidentiality**

The researcher stored the study data securely, ensuring only authorized individuals could access it. All notes and recordings were safely locked away and will be deleted five years' post-study. To safeguard employees' identities, they were renamed from "Participant1 (P1)" to "Participant 8 (P8)" based on interview order.

- **Harm to the participants**

The study did not harm the participants in any way. All the protocols gazetted by the World Health Organization concerning the spread of the Covid-19 virus were observed. The interviews were conducted in a well-ventilated venue, all the participants wore their face masks, and their hands were sanitised before and after the interviews.

## **4. Results of Interviews and Discussion**

In this section, the themes are analysed and discussed based on the participants' views. These themes are (1) cost management, (2) lengthy JIT, and (3) customer satisfaction.

## 4.1 Cost Management

The participants noted that many costs were related to the absence of Lean manufacturing. Some of the challenges identified were customer refunds, buying material and producing customer garments, and buying stock such as the PPE boots for the shop. Other participants noted that without Lean manufacturing, the organisation's inventory was being inconvenienced by outdated stock. As one participant put it:

*"We can do with some investment in the new stock that can attract customers because our stock is old. Some customers are buying, but it would be nice to get the new stock to attract new customers."*

The participants' comments suggested that cost management motivated their interest in adopting lean manufacturing because it would enable the company to stop buying and manufacturing products that were not selling and, instead, buying and producing products that would attract customers. The participants favoured "doing things right the first time" to avoid customer orders being rejected, to have a steady stream of projects, and so that employees did not get paid for non-profitable tasks. Participants stated:

*"...yes, it's important for the organization to reduce costs and save up some money because we don't know what tomorrow holds, and all employees still need to get paid."*

*"Re-doing the customers' orders especially those who order in bulk and on salaries because sometimes we get paid for not doing anything on days when there are no projects."*

Adopting Lean manufacturing, therefore, makes business sense for the organisation because it eliminates costs arising from redundant project timelines, such as buying unnecessary material and spending too much time on a particular project; paying salaries when there has not been any project; and making other purchase orders and maybe taking out loans because the employees must get paid even when the business does not make any income.

## 4.2 Lean Manufacturing

Using Lean manufacturing, a participant noted, the management could adopt three accounts or saving categories. The first would be for material, to buy material and have inventory on hand for when projects come up. The second would be for the workers to have money put aside for workers' monthly salaries. The third would be for the profits made by the company, which could be saved for the company. One participant said that cost management motivated the adoption of Lean manufacturing:

*"Because it cost money. If we throw away usable cut offs, this means that the company must buy material again when customers want their garments to be branded. With us eliminating waste and reusing the cut offs, it helps us save the company's money."*

Another participant added that:

*"As times goes, it can cut costs were the company feels like it is wasting money. But currently because we are on a growing stage, I think it is fine the way things are. Making sure that the factory produces the right sizes, so they don't have to redo the customer's order, and I also don't have to rebrand because*

*that's a double loose. In so doing, we do things right the first time and I think that will increase our profits."*

The participants' views reflect that Lean manufacturing allows cost management by enabling proper planning, financial planning, project planning and a branding schedule. Adopting a Lean methodology would enable all employees to know what they were doing and their targets. Using Lean methodology, they would try to push to meet the target. The company would not have so many delays, and time would not be wasted. With a proper plan, the sizes being sewn would be accurate according to the order and not as many orders would be rejected. This would help save costs and reduce delays and waste.

### **4.3 Lengthy Just-in-Time (JIT)**

It is important to note that Lean reduces the lead times and the duration of manufacturing by decreasing the number and length of holding-up periods among the stages and the arrangement period and changing the seasons of the item or model (Donnelly, Kennedy and Widener, 2021). Furthermore, Lean systematically improves production efficiency by removing unwanted work that wastes time and does not add to production (Vendan and Sakthidhasan, 2010). In addition, Lean manufacturing reduces lead times and the time taken to deliver the final product by eliminating unnecessary processes and improving production efficiency (Leyva et al., 2018). The participants conceded that lead times were long during manufacturing, with one participant commenting:

*"We spend too much time on the projects. Because not all tailors can sew work of quality especially junior tailors most of the work wait for senior tailors to do whilst other tailors sit outside. This causes a delay into finishing the project on time."*

By adopting Lean manufacturing, tailors could begin to understand the work and what was required. Based on each one's best qualities, they could then decide among themselves who would do which part of the project. This would help the project to run faster and enable the organisation to deliver promptly with fewer defects.

The participants also acknowledged that the long lead times interfered with the strategic positioning of the organisation, which could be solved by adopting Lean manufacturing. A participant said:

*"Yes, I can sometimes have the branding prepared, but I must wait on the factory to finish manufacturing, in so doing it takes time and then branding also takes time. So, the customers always get their things late. I also think proper planning is not in place, about when the products need to be done and delivered."*

A participant highlighted the importance of lead times:

*"I fully understand my tasks and responsibilities...I have all resources I need to do my job so there are no rules complicating the job I do. I would say the only processes that makes my work a bit difficult is not knowing when I am expecting the garments to leave the factory for branding, this will enable me to plan before hand on how and when I am going to brand those garments."*

The lead time could be longer if the time it takes to fulfil the customer's order were not communicated with the client previously or with the tailors, who are the people that know the work and complexity of

creating certain items. This means the item's complexity is sometimes not considered, especially if a sample has not yet been created. This causes delays in the delivery time, as noted by one participant:

*“Yes, it does get delays. I would say the things that contribute to the delay are 1) the tailors not focusing on the job on hand...too much talking going on. 2) tailors like me who do slow because I’m perfecting my craft but slowing down the production line. 3) doing a lot of mistakes on customer order.”*

Delays also emanate from taking a tailor off a job they are currently doing and having them do another job that management considers more urgent. With Lean manufacturing, the tailor can complete one job and then move on to another, so there will be no delays on the first job. In addition, Lean manufacturing can re-organise the work and streamline it for shorter lead times. A participant pointed to delays caused by staff without the required skills for a project:

*“The way the job is coordinated amongst the tailors can cause a delay, because the company has a total of 10 tailors but sometimes the junior tailors sit outside and the senior tailors are the ones that get to work on certain projects because boss is afraid that the junior tailors will cause defects on the final garments, so he rather has them sitting outside than to make a mistake on his orders. By having a few people working on a certain project it takes longer to complete than having the whole team on board and sharing the work.”*

In summary, there is a need to manage the flow of resources within the production system to reduce the waiting time for the employees. From the literature reviewed, it is noted that a good flow will enable work to progress steadily through the system by identifying all the delays, interruptions, and bottlenecks and enhancing reliable delivery (Leyva et al., 2018). This is confirmed through employee training and development, which enhance a project's smooth flow by enabling employees to be responsive, adaptive, and multitask (Dennis and Shook, 2020).

#### **4.4 Customer Satisfaction**

The participants identified customer satisfaction as necessary for their work, with one participant stating:

*“I believe that the Lean processes improve the company because we have been struggling especially with the return of unsatisfied customer orders, this Lean process can help us minimize that. If I cut wrong or make a mistake cutting, it will cause the tailors not to be able to sew properly and thus decreasing customer value of the final garment.”*

Using Lean manufacturing, management could appoint people to control certain processes influencing and satisfying customer needs. Through Lean manufacturing, management could employ someone who oversees making a pattern and cutting; someone who oversees the sampling stage; someone who oversees workflow; and someone who will give a daily report to the management. In this way, management would improve the operational efficiency of the organisation.

According to the literature reviewed, a major goal of implementing Lean manufacturing is to achieve perfection (Maware and Adetunji, 2019). This can be attained through continuously analysing each process for possible improvements. Manufacturers need to know that every process can be improved, and a process is never perfect (Furlan, Vinelli and Dal Pont, 2011). In the production process, incorporating Lean methodology and the constant process of upgrading into the culture of the

organisation can aid in achieving perfection. All employees must work towards perfection in their jobs and deliver high-quality products that meet customer needs (Vendan and Sakthidhasan, 2010). In the case of Phaswana Textile and Manufacturing, Lean manufacturing would help the organisation to conduct proper project planning with a start time and estimated finish time. This plan should be conveyed to the employees so they can work towards meeting the targeted deadline for delivery to the customers.

Another participant explained:

*“As my main core is pattern making and cutting, if there is a new customer order of a garment I haven't done before, it would be nice if as the company we can get a sample either from the customer if they have it, or the boss can buy that item, then it would be easier for me to create a pattern exactly as per customer's request and get the size measurements right.”*

Through Lean manufacturing, the customer's value would be increased because the end garment would meet their requirements, and it would be the right size measurements for them; these are some of the problems that decrease customer value. The participant continued:

*“...on material to fix damaged garments that are not accepted by the customer. Remember we are a bulk manufacture, imagine the customer rejecting the whole order, now the costs are twice as high, and the company is probably not making a profit after redoing the customer's order.”*

Lean manufacturing is essential for tailors to focus on the work to make fewer mistakes, for the cutting person to cut properly, and for the person making the sample and pattern to cut them to the right size. Through the collaboration brought about by Lean, a senior tailor could be involved in the cutting process to ensure that the tailor whose job this is cuts the fabric correctly so that it is easier for the other tailors to sew quality work that will result in customer value.

## **5. Managerial Implications**

From a managerial perspective, the research is of value to small and medium companies similar to Phaswana Textile and Manufacturing, particularly in Phaswana's attempt to implement lean methodology in its business processes; it helps the organisation to understand and know how to implement lean methodologies to enhance organisational performance. In addition, the study's findings assist the management in determining the influence of lean methodology on the organisation's operational efficiency. The study contributes to the body of knowledge on procedures that can and will enhance the performance of producing organisations by investigating the extent to which lean production techniques affect operations inside a company.

The findings of the study showed that human resources have a strong influence on the implementation of lean manufacturing. However, one threat that could present a barrier is employees' poor application of lean methodology. Therefore, employee training is required to align human skills with the strategic requirements of lean.

It is recommended that the coordination of each job is assisted by people who have the technical know-how through their own training and experience and can be expected to coordinate the job efficiently. Junior tailors should be allowed to watch the senior tailors receive on-the-job training in more complicated work. This presents an opportunity to learn whilst getting the customers' orders out.

Findings from the literature also showed that the involvement of human capital in the design and development of lean methodologies is necessary. A further implication is, therefore, that the organisation, through the human resources department, should:

1. Train employees in the skills they require for lean thinking.
2. Design the jobs.
3. Build trust and loyalty among employees.
4. Enable good and sound employee relations.

Lean methodology requires critical management support to ensure strong commitment from the employee as it involves a wide array of skills, being highly identified with the tasks, a high level of feedback, the elimination of obstacles that interrupt the production process, the removal of all forms of unnecessary waste, the use of teams to solve problems and good relationships between the employees and supervisors. In addition, the training and development of the employees will enhance the smooth flow of work by enabling the employees to be responsive, adaptive and able to multitask (Dennis and Shook, 2020).

## **6. Conclusions, Recommendations, Limitations and Future Research**

### **6.1 Study's Objectives Key Findings and Conclusion**

As a reminder, the study aims to identify the factors influencing the application of Lean methodology at Phaswana Textile and Manufacturing. From the findings and the related discussion, it is essential to note that the factors that may result in implementing Lean methodology at Phaswana Textile and Manufacturing are the need for cost management, shorter JIT, and customer satisfaction. The Lean culture may present a way for the organisation to transition from employee resistance to change by accepting a progressive manufacturing ethos of waste management and promoting sustainability. Lean could also increase value through streamlining client orders, which is closely related to quality management and the respondents' focus on the client experience, with respondents viewing customer satisfaction as an essential consequence of adopting Lean manufacturing. Efforts to shorten JIT and cost efficiency also lead organisations towards adopting Lean manufacturing.

Recommendations based on the study's findings and conclusions are presented in the following subsection.



## 6.2 Recommendations

Based on the literature review and the study's findings and conclusions, the following recommendations are made concerning how Lean methodology can be implemented at Phaswana Textile and Manufacturing.

1. ***Employee Training and Development:*** The study's findings showed that human resources strongly influence the implementation of Lean manufacturing. Findings from the literature also showed that the involvement of human capital in the design and development of the Lean methodologies is necessary. It is therefore recommended that the organisation, through the human resources department, should: (1) Train employees in the skills they require for Lean thinking, (2) Design the jobs, (3) Build trust and loyalty among employees and (4) Enable good and sound employee relations.
2. ***Participatory Planning for Lean:*** Findings also showed that even when employees are aware of the tasks they are required to accomplish, being marginalised in the decision-making processes, such as through lack of knowledge of the strategic planning regarding inventory and sales, leads some to be unprepared for priority tasks. It is, therefore, recommended that the organisation: (1) Engages employees in a participatory way within the Lean production decision-making system to reduce the waiting time and scheduling uncertainty for workers, (2) Implements a good flow of information and active engagement of employees to enable work to progress steadily through the system, (3) Communicates all priority tasks and any forecasted delays, interruptions, and bottlenecks, in this way enhancing the preparedness of employees.
3. ***Planning Customer Value:*** The findings showed that Lean processes can improve the company and alleviate challenges by minimising the return of orders from unsatisfied customers. To plan for customer value, it is therefore recommended that management conduct proper project planning, with a start time and estimated finish time. This plan must be conveyed to the workers to work towards meeting the targeted date for delivering the goods to the customer.
4. ***Building a Waste Management Culture:*** Findings showed that with Lean manufacturing, tailors can be helped by focusing so they do not make costly mistakes. They take time to fix and waste material when the damaged garments need to be replaced. It is recommended that management must: (1) Employ a culture of managing input at the source so that, for instance, the person who is cutting cuts correctly so that workers down the production line do not make mistakes based on incorrectly cut material; (2) Minimise the defects and unnecessary physical waste that involves excess use of raw materials; (3) Streamline other inputs in the production processes, such as by making use of manufacturing software that can predict how the patterns can be placed on the fabric to minimise off-cut waste; and (4) Eliminate avoidable defects and reprocessing costs of products rejected by customers as defective.

5. ***Aligning JIT with Strategic Objectives of Lean:*** One of the reasons for lengthy JITs, as identified in the study, was the delay that emanated from taking a tailor off a job they were currently doing and having them do another job that management had identified as more urgent. Therefore, it is recommended that: (1) Mentorship and coaching be implemented for workers to learn from senior employees who have a better experience; (2) Managers ensure that tasks are allocated in a flexible manner that enables workers to focus on specific tasks and to finish them before migrating to the next task; (3) Employees are allowed the autonomy to manage tasks and conclude them independently without interference; and (4) Human resources be increased through learnerships and apprenticeships to alleviate pressure on the current employees.

The challenge of a customer having to wait lengthy periods for their order to be completed makes the organisation seem unprofessional, with branding taking even more time. The textile and clothing sector, being highly competitive, requires the organisation to use principles and techniques that have the objective of eliminating waste and zero-value-adding tasks at every production process to satisfy customers and remain competitive. The recommendations presented above should reduce waiting time for customers, eliminate waste, and have Lean operations.

### **6.3 Limitations of the Study**

The findings of the study were subjected to the limitations of the study. The organisation had 16 employees, and the study obtained data about the impact of lean methodology on operational efficiency in a small sample size. In addition, the data collection was carried out in compliance with strict Covid-19 prevention regulations, which encouraged social distancing, and the researcher was uncertain whether there would be another total lockdown. To ensure that both the researcher and the employees were safe from the spread of Covid-19, the researcher rescheduled the interviews from June 2021, when the country was under level 4 of the lockdown and the employees at Phaswana Textile and Manufacturing were not reporting to the factory. The data-collection process through interviews took place in December 2021, when the country had moved to level 1 of the lockdown, which had less strict restrictions. Another complete lockdown would have made it impossible for the researcher to obtain data through interviews from the targeted population.

### **6.4 Suggestions for Future Research**

This study is qualitative; only interviews were used to collect data. A limited sample of respondents was selected to acquire data on the phenomenon under investigation. Future studies could also endeavour to collect statistical and descriptive data to address the research questions considered in this study. A blended methodology could also be employed to increase triangulation of research findings. Finally, the findings from this study can be compared with other studies to enhance the analysis and further the discussion on this topic.

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