

RESEARCH ARTICLE

Prospects and Challenges of Lean Manufacturing Deployment within Manufacturing SMEs in Nigeria: A Literature Review

Mohammed Inuwa^{1*}, Aisha Usman²

^{1,2}Department of Business Administration, Bauchi State University Gadau Nigeria

Corresponding Author: Mohammed Inuwa, mrdemotint@gmail.com

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Abstract

Small and medium enterprises (SMEs) played a vital role in manufacturing goods for consumer and industrial purposes, making them instrumental in business growth and economic development. However, issues of poor quality and substandard products prevail due to limited technical knowledge that hindered them from competing locally and globally in Nigeria—arising from the lack of lean manufacturing deployment and implementation. Therefore, the study aims to provide an insight into the prospect and challenges of manufacturing SMEs in Nigeria as it relates to the deployment of lean manufacturing tools and techniques. The study would aid manufacturing SMEs in better comprehending their potentials and problems, hence, deploying lean manufacturing initiatives successfully. The study applied a literature review approach through past empirical and conceptual studies from reputable journals and reports. Based on the available literature, the study finds that though manufacturing SMEs in Nigeria are faced with numerous issues, e.g., poor leadership, lack of qualified personnel, and inadequate funds, they have shown higher prospects of deploying lean manufacturing successfully. The study concludes that manufacturing SMEs should bank on potentials like flexible organizational culture and structure, easy access to customers and suppliers, and flexible manufacturing system to deploy lean manufacturing, which will further aid in waste elimination, value addition, customer satisfaction, and enhanced performance. The study serves as the foundation for further empirical research on issues related to lean manufacturing deployment within SMEs, thereby proffering solutions to the quality challenges they are facing.

Keywords: Lean manufacturing; small and medium enterprises; prospects; and challenges

Introduction

Lean manufacturing is often used interchangeably with Lean management, Lean production, or Lean system, defined by Shah & Ward (2007) as a socio-technical system that removes waste by concurrently lessening or minimizing customer, supplier, and internal variability". It has been proven that Lean manufacturing is an effective technique and a bedrock in the actualization of operational superiority and excellence in manufacturing as it aids firms in removing all forms of wastages in human effort, inventory, time to market, and manufacturing space (Shah & Ward, 2007; Womack & Jones, 1997; Womack & Jones, 2003). The successful implementation of Lean manufacturing by its originators, the Toyota Motors of Japan, brought about an increased interest in the area (Lean manufacturing) in recent years by both Scholars and business practitioners on the possibility of implementing Lean not only in large enterprises but also in manufacturing SMEs successfully, e.g., (Al-Najem, Dhakal, Labib, & Bennett, 2013; Belhadi, Bin, Sha, Touriki, & Fezazi, 2018; Moya, Galvez, Muller, Camargo, & Moya, 2019).

Nevertheless, despite numerous research conducted in the past, Small and medium-sized enterprises continue to face

obstacles in changing their organizations into Lean organizations (Maware, Okwu, & Adetunji, 2021; Ogah, Ogbechie, & Oyetunde, 2020). This results from poor comprehension of aspects of Lean readiness that require proper scrutiny by most change agents before Lean deployment due to non-holistic examination and appraisal of Lean readiness factors and organizational willingness to change to Lean before implementation. Further, Lean applications can be simple for SMEs in. SMEs Yadav, Jain, Mittal, Panwar, & Lyons (2019) have simple structures, fewer employees, a unified organizational culture with better access to customers and suppliers, and faster process flows that enhance organizational readiness for change Lean. However, it can also be problematic because both managers and employees lack a basic understanding of Lean and its advantages to their organization and its compatibility with their characteristics (Pearce, Pons, & Neitzert, 2018). Consequently, for manufacturing SMEs to be Lean ready, it will be essential to have a compelling value chain that facilitates and enhances supplier relations, process flows within the organization and greater customer satisfaction which will, in turn, result in just in time as well as pull production thereby reducing waste and maximizing efficiency.

SMEs are an essential part of the Nigerian economy contributing to 76% of the entire country's workforce and

49% of GDP contribution (PWC, 2020). Studies show that approximately SMEs represent about 90% of the manufacturing/ industrial sector in terms of the number of enterprises (Ministry of Budget & National Planning, 2017; PWC, 2020). According to the Bank of Industry (2018), Nigeria's manufacturing SMEs majorly engage in less advanced manufacturing, simple to manufacture. Products that SMEs in the manufacturing sector manufacture tend to target end consumers rather than other businesses. It is said that SMEs in Nigeria have significant untapped growth potential with solid export and employment potentials which can be achieved through the right amount of economic enabling (Olaore, Bimbo, & Udofia, 2020; Oyelaran-oyeyinka, 2020). However, despite SMEs' potential to soon constitute a significant portion of GDP, Nigeria has historically shown a lack of commitment to building a strong SME sector (PWC, 2020). The industry continues to be weighed down with challenges that ultimately impact the nation's growth (Oyelaran-oyeyinka, 2020). In countries at the same levels of development as Nigeria, SMEs contribute a much higher proportion to GDP than currently observed in Nigeria compared to other emerging markets (Central Bank of Nigeria, 2019; Oyelaran-oyeyinka, 2020). Manufacturing SMEs in Nigeria contribute approximately 1% of GDP compared to 40% in Asian countries and 50% in the US or Europe (PWC, 2020).

The country's economy depends highly on crude oil, making it a single commodity for economic activities. Crude oil renders more than 95% of exports and exchange in foreign incomes, while the manufacturing sector contributes only less than 1% of total exportations (PwC, 2018). Also, fierce competition for the Nigerian manufacturing industry comes predominantly from Asia. Studies show that less than 20% of SME manufacturers export their products (Oyelaran-oyeyinka, 2020; World Bank Group, 2020). Recent World Bank statistics have also shown that Nigeria has 13 % manufacturing value-added in terms of GDP, which is lower than China and Malaysia with 26% and 22%, respectively (World Bank Group, 2020).

Further, a recent United Nations Industrial Development Organization (2020) report ranked Nigeria 99th in the Competitive Industrial Performance Index out of 152 countries. The said report also ranked Nigeria 116th in Manufacturing Value Added Per capita Index. World Economic Forum (2018) backed the above, ranking Nigeria as 115th out of 140 countries globally in competitiveness and industrialization. Thus, reasons for the sector's decline were -1.5% in 2015, -4.3% in 2016, -0.2% in 2017, 2.1% in 2018, to 0.8 in 2019, as reported by the Central Bank of Nigeria (2019). Furthermore, the 2016 Global Manufacturing Competitiveness Index, as postulated by Deloitte Touche Tohmatsu Limited and US Council on Competitiveness (2016), shows that Nigeria descent to number 38th out of 40 countries, with an index ranking of 23.1% out of 100%. The report further projects that Nigeria will remain in the exact status of 38

positions up to 2020. Also, the country's dependence on imported goods worsens the patronage of locally manufactured goods (Oyelaran-oyeyinka, 2020; PwC, 2018). This further shows that Nigeria's manufacturing sector is highly volatile and lacks the capacity and technical know-how to compete favorably at the local and global levels despite its potentialities. Therefore, the study aims to identify the assess the prospect and challenges of manufacturing SMEs in Nigeria as it relates to deployment of lean manufacturing initiatives.

Concept of Lean Manufacturing

Comprehensive research on Lean manufacturing was first done by Womack et al. (1990) in their book titled *The Machine That Changed the World*. It was the authors of this book that took their time in collaboration with other American, Japanese and European auto manufacturers, government institutions, and financial agencies to thoroughly research and investigate how the Toyota production system works (Emiliani, 1998, 2006; Martínez-lorente, Dewhurst, & Dale, 1998). These researchers' work first identifies how to change from the obsolete mass production system to modern-day Lean manufacturing after five years of research in the Western automotive industry (Samuel, Found, & Williams, 2015).

This situation led to global acceptance and further understanding of Lean manufacturing; firms all over began to adopt the Lean manufacturing technique and were able to succeed and achieve long term sustainability and growth through continuous improvement and waste removal (Dennis, 2010; Womack & Jones, 1997; Womack et al., 1990; Womack & Jones, 2003). Resulting in more outstanding quality, customer satisfaction, enhanced supplier relationship, and cost-effectiveness. Lean tools and techniques include Just in Time (JIT), total preventive maintenance (TPM), continuous improvement (kaizen), comprehensive quality management, and pull production (Akter & Yasmin, 2015; Belekoukias, Garza-Reyes, & Kumar, 2014; Masuti & Dabade, 2019). It also includes practices of 5s; set, sort, standardize, shine and sustain (Ito, 2019; Valentine & Gupta, 2019).

Further, Lean manufacturing has no single definition; several authors define it differently. For instance, Carreira (2005) is that Lean manufacturing is a technique that aims to identify non-value-added activities and convert them to value-added activities that are geared toward customer satisfaction, cost-saving, and improved efficiency. Lean is a systematic methodology that aims at identifying and eliminating waste through continuous improvement, following the product at the pull of the customer in pursuit of perfection (Choudhary, Kaushik, Nirmal, & Dhull, 2012). Also, Chiarini (2013) defined Lean manufacturing as a system that seeks to "flush out" and fight waste in every process: from marketing to production processes, from administrative to strategic ones. Additionally, Earley (2016) sees Lean

manufacturing as the absolute minimum set of mandatory activities to achieve the desired result.

Shah & Ward (2007) coined it as an integrated socio-technical system whose main objective is to eliminate waste by reducing or minimizing supplier internal customer variability, among the popular definitions of Lean manufacturing. This concept of Lean manufacturing seems more appropriate to the context of this research. As discussed earlier, Lean manufacturing initiatives have not been fully implemented by manufacturing SMEs in Nigeria despite quality challenges faced by local manufacturers (Ogah et al., 2020; Udofia et al., 2021). Most manufacturing SMEs in Nigeria are having a challenge regarding basic managerial and quality management skills that will enable them to effectively run their enterprises (Eniola & Entebang, 2015). This situation further brings about a lack of employee relations, poor planning and control systems, and ineffective supplier and customer integration strategy, leading to poor set-up and absence of a transparent operational system (Oyelaran-oyeyinka, 2020; PWC, 2020; Tarurhor & Emudainohwo, 2020). Also, many SME owners go for cheaper machines and equipment that are obsolete and inefficient, thereby setting the stage for lower-level productivity and production of poor quality goods, which negatively impacts overall product output, market penetration, and acceptance (Onugu, 2005). The issues above require manufacturing SMEs to deploy Lean manufacturing practices, examining their prospects and challenges before full deployment to avoid failure.

Principles of Lean Manufacturing

To further understand Lean manufacturing and be successful in readiness for change, it is imperative to comprehend the system's basic principles (lean manufacturing). Therefore, the principles of Lean are discussed in detail in this section. As posited by Womack & Jones (2003), five fundamental Lean principles are: to specify a value from the point of view of the customer, identify the value stream, make the identified value flow, and set the pull system, which means only make as needed and finally perfection in producing what the customer wants and by when it is required in the correct quantity with minimum waste. Businesses of all forms and sectors must ensure that they have the core principles of Lean before undertaking a Lean journey or applying Lean tools and techniques. These principles set the pace for effective quality initiatives and continuous improvement in the organization.

Value Specification

Value is what the customers pay to acquire a product or service to satisfy their wants and immediate needs (Carreira, 2005; Earley, 2016). It necessitates the need for a firm to ensure that what the customer want (value) is manufactured on time and of the right quality (Mohd &

Mojib, 2015; Vinodh, Somanaathan, & Arvind, 2013). In this regard, Lean focuses its attention on specifying value based on customer viewpoint and hence views any activity that the customer does consider valuable or not willing to pay for as waste that needs to be removed (Garza-Reyes, Betsis, Kumar, & Radwan Al-Shboul, 2018; Shafiq & Soratana, 2020). Firms that aim to implement Lean and be successful have to become more customer-centric or customer-oriented than product-oriented (Bhat & Darzi, 2016).

Customer-oriented firms give more priority to the voice of the customer and effectively build a strong customer relationships management that can enable the firms to understand the customer in a better way and deliver value to them (Garza-Reyes, Arturo, Wong, Lim, & Kumar, 2016). Such organizations are known for their commitment to ensuring that they specify and deliver value to the customer (Ferroco, Lamouri, & Carbone, 2016). However, many unexciting and sophisticated activities that producers do to provide a product are generally of little or no interest (value) to customers (Emiliani, 1998). Therefore, value specification in Lean emphasizes the need to identify value from customers' views, and what remains of it that does not create value is seen as waste or non-value-added activities (Mahendran & Senthil Kumar, 2018). Such non-value-added activities cause unwanted resource exhaustion and hinder effective and efficient flow in the production process (Jaffar, Abdulhalim, & Yosoff, 2012).

Value Stream Identification

Having specified a value from the customer's point of view is the first fundamental principle of Lean. The next step is to identify the value stream in all processes and operations to fully streamline the needed value for the customer (Womack & Jones, 2003). In Lean production, the value stream implies comprehensively understanding all procedures required to manufacture a specific product and then optimizing the entire process from the customer's viewpoint (Emiliani, 2006; Shokri, Waring, Nabhani, Shokri, & Waring, 2016). It is important to note that the value stream is all-encompassing in the sense that it integrates the entire supply chain, which implies that firms, while streamlining value, should not limit it to internal processes alone, but rather the overall value chain (Čiarnienė & Vienožindienė, 2012).

One significant way of identifying value stream is using single-piece flow in the manufacturing process (Ohiomah & Aigbavboa, 2015; Shamah, 2013). One-Piece Flow, also known as single-piece flow or continuous flow, refers to moving one workpiece at a time between operations within a work cell (Enoch, 2013; Rüttimann & Stöckli, 2015). Attaining one-piece flow aid manufacturing firms achieve holistic just-in-time manufacturing (Ramadas & Satish, 2018). The needed component can be readily available when requested in the exact quantity (Seifermann et al., 2018). Therefore, identifying a value

stream in manufacturing processes or the overall value chain can significantly impact a firm's performance and can aid in the realization of operational excellence. Also, value stream mapping can help firms identify value streams in the whole process and eliminate another form of waste that can hinder effective value delivery to the customer.

Flow Maximization

Flow means cutting back the amount of time to zero for any work sitting idle and waiting for someone to attend to it; flow involves the overhauling work process to achieve the desired result (Liker & Meier, 2006). Creating an adequate flow of value processes throughout the supply chain will ensure that all processes involved in production from start to finish add value to the customer and eliminate unwanted costs. Such a flow will do away with a bottleneck that can hamper quality and efficiency, thereby creating a smooth, accessible, and timely movement of business resources from one point to the other (Kang & Ju, 2017). The essence of creating flow is not just to have material and information moving timely but to also link people and processes together so that problems can be easily traced and tracked through continuous improvement (Liker & Morgan, 2006; Marley & Ward, 2013).

To achieve adequate flow, production smoothening utilizing Kanban is one of the methods used. It allows each process to go to its preceding process and withdraw the necessary goods at the time required in the required quantities (Monden, 1994; Samuel et al., 2015). Further, maximizing flow is not all about total waste elimination, decreasing inventory and cost; it can make an organization more agile by paving the way for flexibility that can lead to effective responsiveness to the demand of the customer (Kumar et al., 2017; Soltan & Mostafa, 2015). Hence, flow is about keeping everything moving steadily through the process from start to finish. Maintaining a steady flow is all about maintaining the balance between demand and capacity.

Setting up Pull System

Keeping inventory based on projected or even assured demand always results in chaos and running out of the very products the customer wants results in excess inventory, rework, and costs (Liker & Meier, 2006). In pull production, the manufacturer only produces when on the customer's demand (Randhawa, 2015), reducing the need for excessive production and eliminating all forms of waste (Andersson, Eriksson, & Torstensson, 2006; Shamah, 2013). In a pull system, the customer activates manufacturing and material withdrawal. The pull production system is ignited by the external customer and initiated back through the production process by each operation's downstream or internal customer. It is a market-in approach to production. Techniques for

achieving an effective pull system include Kanban cards for pulling through the supply chain and the closely related JIT system for inventory reduction (Liker & Morgan, 2006; Saumyaranjan & Yadav, 2018). Also, Heijunka, the Japanese word that connotes production leveling and schedule, is the primary instrument for realizing pull system and inventory minimization (Nikiforova & Bicevska, 2018). Setting up a well-organized pull system is essential to give much attention to human resources as the employees are regarded as the main drivers of such a manufacturing system (Bayraktar, Tatoglu, Jothishankar, & Teresa, 2007). Adopting a pull system as a principle in Lean will aid firms in achieving effectiveness in cost reduction, efficient utilization of employees, and ease in problem identification that require improvement (Jones, 2002).

Aiming for Perfection

Having meticulously implemented the first four principles of Lean manufacturing with success and positive results, perfection's final principle will automatically evolve within the whole production system (Womack & Jones, 2003). The only thing that will flow throughout the production process and entire value chain will be nothing but what will ultimately add value to the customers and reduce the cost to the firm by producing products with higher quality, zero defects, and delivered just in time. Perfection is a significant distinctive competency that can make an organization unique in its operations and lead the market by capturing more customers than other competing firms (Thomas, 1995). Also, aiming for perfection in Lean production implies the prospect of improvement and a systematic waste elimination capable of reducing costs for firms' operations and fulfilling the customer desire at value and low cost (Yadav, Rahaman, & Lal, 2017). Their ultimate aim is to achieve peak operational efficiency and effectiveness for Lean organizations. All organizations' resources are geared towards creating what gives value to the customer with the lowest minimum resources (Belekoukias et al., 2014). Striving to achieve perfection is not as easy as it seems to be because it requires total integration of the overall supply chain and ensuring that all stakeholders play their needed roles (Mourtzis, Papathanasiou, & Fotia, 2016). This implies that the whole business ecosystem has aligned itself to Lean and ensures adequate information sharing to enhance timely productivity and performance (Ghobakhloo & Hong, 2014). Aiming for perfection should be seen as an indispensable aspect of Lean manufacturing because achieving entails that a firm's value chain is highly responsive to the customer; hence it can make a firm perfectly out-compete other rivals in the industry (Dora, Kumar, & Gellynck, 2016). However, aiming for perfection comes with its significant challenges, particularly when it comes to supplier reliability and outsourcing of other aspects of the business to businesses that are non-Lean or partially implementing

Lean (Pakdil & Moustafa, 2014). In such events, loopholes may arise that can create a bottleneck at some point in the supply chain, which may hamper the overall value chain and impede perfection (Martínez-Jurado & Moyano-Fuentes, 2014). Therefore, a broader business ecosystem that is reliable and highly responsive is critical for achieving a hitch-free flow of value to the whole process (Kang & Ju, 2017).

Prospect of Lean Manufacturing in SMEs in Nigeria

While on the one hand, manufacturing SMEs are faced with barriers to successful Lean deployment, on the other hand, some researchers believe that manufacturing SMEs have fewer barriers to succeed in Lean deployment (Alexander et al., 2019; Maneesh Kumar & Antony, 2008; Pearce, Pons, & Neitzert, 2018). According to Al-Najem, (2014), SMEs have a better chance of adapting to change than large companies, as they can internalize and crystallize information across departments more efficiently (Achanga, Shehab, Roy, & Nelder, 2006; Koponen, 2019). Moreover, SMEs are less hierarchical and bureaucratic than large firms, which means they are better at responding to change (Al-Najem et al., 2013). Similarly, Rymaszewska (2014) suggested that SMEs have the potential and dynamism to adopt any form of continuous improvement initiative like Lean manufacturing or Lean six sigma. They are characterized by strengths that offer them higher advantages and faster communication. The quick decision-making process, unified organizational culture, greater flexibility, and quicker response to the customer means that they do not need radical change and can take what they want from Lean tools and techniques, and have a low resistance to change; and their ambitiousness to learn, which allows them to compete in the market and adopt new systems to stay alive (Al-Najem et al., 2013). These enabling factors are discussed in detail below.

Faster Communication

Manufacturing SMEs have better and more smooth communication channels due to the small size of organizations, and communication bottlenecks are easily identified and resolved timely (Rymaszewska, 2014). Faster communication allows for effective exchange and sharing of data and information within and outside the firms, resulting in more rapid decision-making (Aminu & Shariff, 2015). By implication, Lean requires a timely and efficient exchange of information at different levels of production and processing, which will enhance customer satisfaction through JIT delivery (Brunswicker & Vanhaverbeke, 2015). Also, effective communication can serve as a foundation for Lean readiness. It also facilitates better harmony between operational staff and management staff, thereby committing to change and improvement (Al-Balushi et al., 2014).

2.2.2. Flexible Organizational Culture

Eniola, Olorunleke, Akintimehin, Ojeka, & Oyetunji (2019) showed that quality initiatives apply to SMEs as they can build the required culture in terms of leadership and workforce involvement much more quickly than large companies since they have relatively little functional differentiation, which makes the management very close to workers. Koponen (2019) shared the same view, suggesting that the organizational culture in SMEs is full of energy and that they are willing to "learn and change" rather than "control"; the SME culture is more friendly since relationships between workers and top management are loose and informal. They are more flexible, respond quickly, have versatile human resources, and suffer less bureaucracy than larger organizations. In Nigeria, a study was carried out by Eniola et al. (2019) within the SME manufacturing sector; the study's findings reveal that organizational culture is an essential factor for performance. Shuaib & He (2021) also conducted research within manufacturing SMEs in Nigeria to assess the impact of organizational culture on quality management and innovation practices among manufacturing SMEs in Nigeria; the study reveals that clan culture and market culture were positively related to quality management, while adhocracy and hierarchy cultures were discovered to be negatively associated with quality management.

Simple Organizational Structure

Another distinction is that SMEs' organizational structure is flat, and decision-making is shorter due to fewer management layers, which leads to a better organization between departments and less resistance to change than in larger organizations (Al Badi, 2019). SMEs are also simpler to implement Lean initiatives as they are less bureaucratic than large organizations, making coordination and communication between staff effective (Alkhoraf, Rashid, & Mclaughlin, 2019). SMEs within the Nigerian context SMEs are also characterized by the flexible organization due to their smallness and nature of production, as they primarily engaged in the manufacturing of less advanced products and consumable items (Bank of Industry, 2018)

Easy Access to Customers

Most SMEs, by nature, have fewer customers compared to their larger counterparts, which gives them the upper hand to have direct contact and interaction with customers daily and understand their preferences (Alkhoraf et al., 2019). Impliedly, SMEs can take that advantage and build better customer relationships, enabling success in Lean readiness and deployment (Al-Najem et al., 2018). Also, fewer customers can allow customers to meet JIT more efficiently because they can easily predict their daily sales target and produce what is needed by the customer, thereby curtailing the wastage of resources (Antonelli & Stadnicka, 2018). In Nigeria study carried out within

manufacturing SMEs to examine organizational readiness for change to Lean proposes a positive and significant relationship between customer relations and organizational readiness for change (Inuwa & AbdulRahim, 2020). Research carried out among manufacturing SMEs in Nigeria to examine strategic management practices on performance finds that customer relations and engagement significantly impact enterprise performance (Omelogo, 2019). Additionally, customer relations were found to have a positive and significant effect on s Nigerian manufacturing SMEs ' performance (Amin, 2021).

Easy Access to Suppliers

In manufacturing SMEs, suppliers are believed to have little bargaining power as they depend upon the tiny niche of the market (SMEs) to serve (Alkhoraf et al., 2019). This gives the SMEs the advantage of the bargain and sets rules for their suppliers' transactions. Also, because SMEs are at an early phase of the supply chain, it gives them direct access to numerous suppliers that procure raw materials at even lower costs than their larger counterparts (Jain, Bhatti, & Singh, 2015). Such a scenario can enable SMEs to acquire raw material timely and at a lower price which will, in turn, bring about JIT as well as cost minimization and hence serve as an enabler for Lean deployment and implementation (Yawar & Seuring, 2020). In the Nigerian context, a study conducted with quoted food and beverages manufacturing firms finds that supplier relationship management through supplier appraisal, supplier development, and supplier involvement has a positive and significant relationship on firm performance (Ajayi, Arogundade, & Opaleye, 2021). Also, a study carried out in Nigeria to estimate how supply chain activities of manufacturing firms influence their firm performance concludes that supplier management has a substantial impact on performance (Amole, Adebisi, & Oyenuga, 2021).

Better Teamwork and Group Cohesion

Due to their size nature, SMEs have a more significant advantage in collaboration and group cohesion, enabling them to manage disputes effectively and work harmoniously (Al-Najem, Garza-Reyes, & ElMelegy, 2019). Unlike large-scale enterprises with numerous units and departments, which are complex to manage due to many employees and various channels of decision making, SMEs can efficiently work as a team and deliver more effectively. This characteristic of SMEs gives them an enabling chance to deploy Lean since teamwork is regarded as necessary in Lean practice (Seth, Seth, & Dhariwal, 2017). Further, working as a team facilitates early problem detection and enhances effective communication among team members, resulting in fewer errors and mistakes and promoting creativity and innovation (Ceptureanu, 2015).

Challenges of Lean Manufacturing in SMEs in Nigeria

Manufacturing SMEs are slow at embracing Lean initiatives, which can be a result of inhibiting factors like; resource constraints, dearth of skilled workforce, the poor customer and supplier relationships, which is seen as an essential requirement to succeed in Lean deployment (Alkhoraf et al., 2019; Belhadi, Bin, Sha, Touriki, & Fezazi, 2018). Also, SMEs face considerable difficulties in deploying Lean in terms of financial constraints and other required resources (Achanga et al., 2006). Some of the major inhibitors to Lean deployment in SMEs are discussed below:

Lack of Top Management Commitment

Management commitment is a crucial ingredient for the success of any new initiative (Pearce et al., 2018). Lack of management commitment leads to a swarm of other problems, like restricted access to resources, delays in decision-making processes, and improper communication (Achanga et al., 2006; Al-Najem et al., 2018). Lean readiness strictly requires consistent involvement, encouragement, and supervision of the top management (Alkhoraf et al., 2019; Panizzolo, Garengo, Sharma, & Gore, 2012). The top management has to set the vision, strategy, goals, and a direction to keep the project (Gurumurthy, Mazumdar, & Muthusubramanian, 2014; Uluskan, McCreery, & Rothenberg, 2018). Especially in the SME context, this factor is highly relevant due to the direct involvement of top management in regular operations, direct supervision, and deliveries (Yadav et al., 2018). By implication, top management needs to involve and commit itself assiduously for SMEs to be Lean ready and successfully deploy Lean initiatives (Habidin & Yusof, 2013). Within the context of Nigeria, a study carried out by Onogu (2005) reveals that lack of leadership commitment is among the key factors that hinder the success of SMEs in Nigeria. Similarly, poor leadership training and lack of expertise from SMEs' managers are significant failure factors for the successful implementation of lean initiatives within SMEs in Nigeria (Ogah et al., 2020; Oyelaran-oyeyinka, 2020; PWC, 2020).

Lack of Employees' Involvement

The inability of organizations to assess the readiness of their workforce before Lean deployment is seen as one of the major causes of Lean deployment failure (Yadav et al., 2018). Employees are critical to the organization's change initiative as they will be affected the most by the changes (Mueller, Jenny, & Bauer, 2012; Panizzolo et al., 2012). Therefore, successful Lean transformation requires that employees be carried along in setting organizational vision, goals, and values. Also, partaking of employees enhances the flow of ideas and information capable of

contributing to problem-solving. The involvement of employees and management acts as cement in the wall (Saumyaranjan & Yadav, 2018; Yadav et al., 2018). In Nigeria, a study was carried out to examine the pains and gains of manufacturing SMEs; the study's finding reveals poor employee training and development is a significant barrier to SMEs' success (Olaore et al., 2020). Similarly, a survey conducted within Nigerian SMEs to investigate the role of servant leadership and the work climate created by the leader in reducing employee turnover; discovered that a high employee turnover rate is among the significant challenges SMEs face (Amah, 2020). In the same vein, it was found that employee management is among the key factors hindering the performance of SMEs in Nigeria (Adewale, Henry, 2021; Udofia et al., 2021).

Poor Communication and Feedback

Lack of effective communication between all levels of organizational hierarchy and between internal and external stakeholders inhibits Lean readiness among manufacturing SMEs (Yadav et al., 2018). This creates a gap in information exchange between management and their subordinates at the operational units, hindering performance and creating a bottleneck that lowers productivity (Gupta & Jain, 2013). Therefore, proper communication between the organization and its external customers is the critical success factor in Lean readiness (Vakola, 2014). Having a foundation for perpetuating successful Lean efforts, a communication strategy to acknowledge progress and exhibit reward efforts and work is essential to this readiness factor (Al-Balushi et al., 2014).

Resistance to Change

The sudden introduction of new methods makes employees uncomfortable because they are more comfortable with the traditional techniques, which made middle management and shop floor workers provide a "resistance to change" during Lean implementation (Azuan & Ahmad, 2013; Yadav et al., 2018). However, the reasons for resistance to change may be different for managers and workers. Fear of failure was of concern among managers, while workers were more apprehensive about their jobs (Mohamad Al-Najem et al., 2013). Similar observations were made of SMEs due to lack of knowledge about Lean may also create a negative mindset for employees (Belhadi et al., 2018; Shokri, Waring, & Nabhani, 2016). This shows that lack of readiness can lead to frustration among employees, resulting in resistance to change at various levels across the business and confusion due to the lack of fear of the unknown.

Poor Organizational Culture

An organization's culture may be defined as rules and behaviors covering trust, hierarchy, working environment,

and fellow feelings (Dora et al., 2016). It is highly desirable to have an excellent organizational culture regarding communication skills, long-term focus, and strategic team while intending to deploy a Lean initiative. While most large organizations are cognizant of this, regardless of their choice of cultural models or success in using them, many SMEs, by default, reflect in their culture the personality of the owner/manager and are constrained by this in terms of the changes they may be able to undertake (Achang et al., 2006).

Inadequate Training and Skill of Human resources

Trained and skilled employees are considered an asset for successful Lean deployment, as it strictly enhances the basic knowledge of Lean (Dora et al., 2016; Papazoglou, Elgammal, & Krämer, 2018). However, lack of training and skills is considered one of the reasons for a low degree of Lean implementation in SMEs (Chaple, Narkhede, Akarte, & Raut, 2018). Further, most SMEs sidestepped training programs due to financial and time constraints. This, in turn, results in employees' insufficient skill, thereby becoming an obstacle to succeeding in Lean deployment (Ping-yu, 2009). It is believed that poor knowledge of Lean concepts of SMEs, owner-managers, and employees is one of the significant factors that cause resistance to change from the operational level and lack of commitment from the top management (Alhuraish & Robledo, 2014). Organization members' prior knowledge of Lean practices, tools, and techniques can serve as an essential readiness factor for the successful deployment of Lean in manufacturing SMEs (Al-Najem et al., 2018; Al-Najem et al., 2013). It will mitigate the issue of resistance and lack of commitment to change in the overall organization, thereby paving the way for successful Lean deployment. It is argued that if the benefits of any new initiatives are clear to the stakeholders, they become motivated to adopt the industry (Yadav et al., 2018). Additionally, measuring improvements also motivate the stakeholders (Bhasin, 2012). However, in Nigerian manufacturing SMEs, a study aimed to determine SME managers' human resource management practices found that employee relations are among the main challenges SMEs face (Felicia & Ibeneme, 2019). Also, in similar research, it was found that human resources management due to poor motivation is a critical factor that hinders the performance of SMEs (PWC, 2020). Moreover, Adewale (2021) conducted a study on human resource management among SMEs in Nigeria; the study's findings reveal that lack of employee training and involvement is a significant hindrance to growth.

Lack of Supplier Involvement

Suppliers are an essential and integral part of a company (Yadav et al., 2018). They have seen the backbone of a manufacturing firm's survival and need to be fully involved and aware of organization supply schedules to

avoid delivery failure, which may hinder production (Tasdemir & Gazo, 2018). Consequently, to endure and grow in today's dynamic and highly competitive environment, suppliers should be regarded and treated as an extension of the organization (Panizzolo et al., 2012; Yadav et al., 2018). It is necessary to extend the Lean implementation to their supply chain partners; however, it is difficult for SMEs to develop an integrative Lean supply chain as most SMEs have poor relationships with their suppliers (Afonso & Cabrita, 2015; Ai, Bakar, Hamid, Rasli, & Baharun, 2012). In other findings by Yadav et al. (2018), it was revealed that the suppliers were not actively involved in Lean deployment within manufacturing SMEs.

Backsliding to Old Methods and Short-Term Planning

Inability or neglect of organizations to assess overall organizational readiness for change before Lean deployment is the primary reason behind backsliding to old ways. Such situations arise in anticipation that new quality initiatives may result in workers' retrenchment (Emiliani, 1998; Wong & Wong, 2014). Similarly, the major problem in Lean implementation is the propensity to revert to traditional practices when difficulties are encountered (Randhawa & Ahuja, 2017; Ruffa, 2008). It was revealed that the supervisors and workers stuck to their old methods and did not follow the new techniques suggested by the consultants (Yadav et al., 2018). Most SMEs are characterized by short-term planning, hindering them from successfully deploying Lean and reaping its benefits (Wang & Liu, 2013). The Lean initiative is seen as a continuous improvement journey requiring proper planning and persistence and a long-term strategy to be released (Pakdil & Leonard, 2017). Most SMEs fail in lean deployment because of their attitude toward achieving quick results and cutting costs, which will not improve sufficiently with the Lean implementation journey (Chaple et al., 2018). Also, the paradox of seeing the need for change and being reluctant to introduce new ways of thinking might block the introduction of Lean manufacturing. Short-termism often makes companies unprepared for the changes; therefore, their reactions would mostly be chaotic and inadequate (Rymaszewska, 2014).

Discussion and Conclusion

The study aims to identify the prospect and challenges of lean manufacturing deployment within SMEs in the Nigerian manufacturing sector. The study indicates that Nigerian manufacturing SMEs display numerous potential to deploy lean and reap its benefits successfully. Some of the possibilities include flexible organizational culture and structure, which gives them the ability to make faster decisions, unlike their large counterparts. Ease of customer access also offers a good prospect for deploying lean manufacturing within SMEs. Due to their small size

and few customers, SMEs have direct contact with their customers, allowing them to share and exchange information faster and effectively, leading to higher customer satisfaction and involvement. It also shows that manufacturing SMEs within Nigeria have a flexible and better organization favorable for the deployment of lean initiatives. The findings correspond with studies of (Eniola et al., 2019; Shuaib & He, 2021).

However, despite the prospect of successful lean manufacturing deployment within SMEs in Nigeria, challenges persist, which serves as a bottleneck. Lack of leadership commitment due to poor knowledge of lean initiative and techniques made most SME managers fear deployment due to fear of unknown outcomes that may lead to loss. Lack of employee involvement and training is also among the factors hindering successful lean deployment; most employees within Nigerian manufacturing SMEs are unskilled workers and lack the basic knowledge of continuous improvement. Also, SMEs cannot afford to train their employees due to limited financial resources. Further, the change resistance is also among the challenges SMEs face in Nigeria; most SMEs prefer to use obsolete production methods, resulting in wastage and poor quality. Similar findings were made in the studies of (Ogah et al., 2020; Oyelaran-oyeyinka, 2020; PWC, 2020).

Consequently, the study concluded that top management and leadership should prioritize training and educating employees on crucial aspects of quality practices and continuous improvement initiatives that further improve their skills in relationships with customers and suppliers. Numerous studies have reiterated the role of employee relations in successful performance lean deployment. Though, SMEs may not have the financial resources to train and retrain their employees due to limited funds availability. It advised that the government, through its agencies, should collaborate with SMEs and provide and fund training on quality practices that can further facilitate Lean readiness and successful deployment of Lean in SMEs. The government can play a significant role in uplifting SMEs in the manufacturing sector and further contributing to industrialization.

Recommendations for Future Research

The current study is a literature review; therefore, it is recommended that future studies should conduct qualitative, quantitative, or mixed-method research to verify the literature further. Also, the prospective analysis can compare manufacturing and service SMEs for a better understanding of the peculiarities of lean manufacturing.

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