Mediating Effect of Supplier Relations on Organizational Culture and Customer Relations in Measuring Lean Readiness Amongst SMEs: An   Importance- Performance -Map Analysis (IPMA)

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Abstract

The study aims to examine the mediating effect of supplier relations on the relationship between organizational culture and customer relations in lean readiness assessment within manufacturing small and medium-scale enterprises in Nigeria. A questionnaire was administered to managers of manufacturing SMEs. Retrieved and usable responses were analyzed using SMART PLS 4 for measurement model, structural model, path coefficient, and Importance-performance map analysis. The study's findings reveal that positive and significant relationship exists between organizational culture and supplier relations. The relationship between supplier relations and customer relations was also positive and significant. Also, supplier relations mediate the relationship between organizational culture and customer relations. The importance-performance map analysis revealed that supplier relations is fundamental regarding lean readiness evaluation before full deployment. The study implies that culture match and alignment between supplier relations and customer relations are sacrosanct for practical lean readiness assessment and effective deployment within manufacturing SMEs. It further emphasizes the importance of supplier relations in achieving full lean readiness. Hence, the study contributes theoretically by examining the indirect role of supplier relations on organizational culture and customer relations. The study also offers insight to small and medium-sized business managers to make effective decisions on lean readiness before full implementation, minimizing the chances of unsuccessful lean deployment.

Keywords: lean readiness, organizational culture, customer relations, supplier relations

1.1   Introduction

For organizations to achieve competitiveness in today's market, archaic production and other manufacturing operations (crafts and mass production) is no longer profitable and result-oriented (Maware, Okwu, & Adetunji, 2021; Vamsi, Jasti, & Kodali, 2015). Leading to increased production costs, joined with excess waste and non-value-adding, which devastatingly impacts the performance of the overall business (Maware et al., 2021; Vamsi et al., 2015). Therefore, the need for business organizations to be prepared and ready to transform and familiarise themselves with improved quality practices like Lean manufacturing is paramount to their survival. 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 is integrated to remove waste by concurrently lessening or minimizing customer, supplier, and internal variability".

The application of Lean manufacturing the Toyota Motors of Japan has brought about an increased interest in the area (Lean manufacturing) recently as S\scholars and business practitioners reiterate 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). However, Lean manufacturing strategies have been mainly conceived to be deployed in large organizations, making SMEs deal with such a type of project as a risky decision that must be prepared for change before deployment.

 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 organisational 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, able to respond quickly, have versatile human resources, and suffer less bureaucracy than larger organizations (Maware et al., 2021; Moya, Galvez, Muller, Camargo, & Moya, 2019).

Also, SMEs, by nature, have fewer customers than their larger counterparts, giving them the upper hand to have direct contact and interaction with customers daily as well as understanding their preferences (Alkhoraif, Rashid, & Mclaughlin, 2019). Impliedly, SMEs can take that advantage and build better customer relationships, which can enable successful lean readiness and deployment (Al-Najem et al., 2018). Also, fewer customers can enable customers to meet JIT more efficiently because they can predict their daily sales target so quickly and produce what is exactly needed by the customer, thereby curtailing the issues of wastage of resources. In manufacturing SMEs, suppliers are believed to have little bargaining power as they depend upon the little niche of the market (SMEs) to serve (Alkhoraif et al., 2019). This gives the SMEs the bargaining advantage and sets rules for transactions with their suppliers. Also, since SMEs are at the early phase of the supply chain, it gives them direct access to numerous suppliers, which made procure raw materials at even lower costs than their larger counterparts. Such a scenario can enable SMEs to acquire raw material timely and at a cheaper cost. This will in turn brings about JIT as well as cost minimization and hence serve as an enabler for lean deployment and implementation.

Further, the significant role of SMEs in the manufacturing sector and the overall global economy cannot be over-emphasized as they are the catalyst for economic growth. Hence, they need to be receptive to changes that may lead to further growth and sustainability through constant continuous improvement initiatives. SMEs are a crucial 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, which is 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).

Moreover, studies have shown that manufacturing SMEs in Nigeria implement quality practices in their businesses, e.g. (Eniola, Olorunleke, Akintimehin, Ojeka, & Oyetunji, 2019; Inuwa & AbdulRahim, 2020; Nwachukwu & Hieu, 2021; Udofia, 2019; Udofia et al., 2021). However, despite SMEs' potential to constitute a significant portion of GDP shortly, Nigeria has historically shown a lack of commitment to building a strong SME sector (PWC, 2020). The sector continues to be weighed down with challenges that ultimately impact the nation's growth (Oyelaran-oyeyinka, 2020). In countries with the same development levels 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). In the same vein, Lean manufacturing still has its problems, as apparent in the rate of failed implementations Schröders & Cruz-Machado, (2015), which is mainly associated with a lack of assessment of readiness and understanding of true principles and practice of Lean before implementation. Most manufacturing SMEs either derail from Lean practices or backslide to old ways due to their inability to deploy Lean successfully, mostly traced back from failing to unfreeze their organization to create and assess their readiness and preparedness before implementing the change (Maware et al., 2021;Yadav, Jain, Mittal, Panwar, & Lyons, 2019; Yadav, Jain, Mittal, Panwar, & Sharma, 2018).

It is ascertained that they still have quality control problems, including inadequate plant maintenance, lack of skilled operators and inspectors, and a virtual absence of modern equipment. This has been a problem with most manufacturers in Nigeria as they neglect to exploit techniques and practices which can make them perform their business operations efficiently (Ogah, Ogbechie, & Oyetunde, 2020). Business operations like forecasting of production, management of inventories, and continuous improvement techniques are some practices that are not fully deployed in Nigeria and other African countries (Inuwa & AbdulRahim, 2020; Olaore et al., 2020). Additionally, the quality control practice in Nigerian manufacturing firms has encountered difficulties due to the absence of awareness of Lean tools and initiatives, failure to recognize the importance of understanding customers' needs, and poor management attitude. The country's manufacturing sector has suffered a decline in production, which has brought about low productivity in some factories or some cases, complete business closure (Ekpenyong Ekpenyong Udofia et al., 2021). Nwanya & Oko (2019) supported this, stating the non-existence of Lean manufacturing in SMEs with low awareness. Therefore, the aim is to assess lean readiness within Nigerian manufacturing SMEs by examining the indirect effect of supplier relations on organizational culture and customer relations.

2.1 Literature review

2.1.1   Customer relations

Customer relationship management refers to the degree to which a firm continuously satisfies customer needs and expectations (Patyal, Ambekar, Prakash, Roy, & Hiray, 2020)**.** In the struggle for competitiveness, a business seeks to realize superior customer relations utilizing the least possible resources, making it mandatory for managers to define clearly the customer relations approach, grounded on sound scientific validation, without ignoring their customer experience (Metz, Ilieş, & Nistor, 2020). It is paramount for firms to understand customers' needs as it will help such firms provide an immediate response to the needs of the customer and adapt to present-day business ecosystems (Tseng, 2016). Involvement of customers in designing a product by suggesting how the product can be upgraded results in customer relationships, which is beneficial to the business as it increases loyalty and satisfaction from the customer (Nyadzayo & Khajehzadeh, 2016).

The importance of building a concrete relationship with a customer cannot be overemphasized since the customer is the main target of an organization (Abbas & Kumari, 2021). Hence, having a cordial relationship with them is indispensable as one of the primary goals of the Lean initiative is to deliver value to customers Womack & Jones, (2003), which be realized only by building a good and cordial relationship with customers. Additionally, previous studies, e.g. (Al-Najem et al., 2013; Garza-Reyes et al., 2018; Salem, Musharavati, Hamouda, & Al-Khalifa, 2016; Saumyaranjan & Yadav, 2018; Yadav et al., 2018), have stressed the vital role customer relationships played as a factor for Lean readiness in manufacturing SMEs. Involving customers in product design and giving them room for suggestions on product improvement set a pace for customer satisfaction, resulting in loyalty (Nyadzayo & Khajehzadeh, 2016). It also gives firms the ability to respond to customer demand which plays a significant role in overall operational performance (Tehseen & Ramayah, 2015).

2.1.2   Supplier relations

Supplier relations are the collection of supplier-related quality management practices to improve suppliers' product and service quality (Patyal et al., 2020). Supplier relations is referred to the degree of collaboration with the supplier to address and tackle issues as well as ensuring just-in-time delivery by considering the number of suppliers, long-term relationships, and involvement in the product design and development process and by providing feedback on suppliers' performance (Iranmanesh, Zailani, Hyun, Ali, & Kim, 2019). Relationships with suppliers are viewed as an interface through which organizations and suppliers seek competitive advantage in the marketplace, tapping into each other's resources as a result of the formation of alliances (Amoako-Gyampah, et-al 2019). Supplier relations represent the determined management of relationships between buyers and suppliers to ensure that supplies of the right quality and quantity are obtained promptly (Alcaraz et al., 2016). A collaborative relationship between manufacturers and suppliers is vital in acquiring raw materials timely for effective manufacturing operations (Kulenović, Folta, & Veselinović, 2021; Tehseen & Ramayah, 2015).

 The quality and reliability of suppliers are substantial for readiness to change to Lean, signifying that the provision of raw materials on time does not necessitate additional checks, resulting in timely production and avoidance of excessive waiting time (Al-Najem, 2014). Moreover, proximity to suppliers can enable manufacturing firms to conduct their operations more efficiently (Abolhassani, Layfield, Gopalakrishnan, & Virginia, 2016; Rose, Deros, Rahman, & Nordin, 2011). Similarly, it was posited that suppliers' efficiency and responsiveness are predicted by satisfaction with their overall performance (Field, Meile, Carroll, College, & Hill, 2008).

2.1.3   *Organizational culture*

An organization's culture formulates the glue that unites the organization by stimulating employees to commit and perform even better (Van Den Berg & Wilderom, 2004). Therefore, conveying organizational culture through an organization and adjusting it to specific internal and external contexts in realizing its objectives requires constant endeavour from a company's management (Metz et al., 2020). Also, it is argued that quality initiatives like Lean practices need to be executed in suitable organizational culture that stresses open communication, something which he believed did not originally belong to quality initiatives but was imperative for its implementation success (Huang, Rode, & Schroeder, 2011; Prajogo & McDermott, 2005). Understanding the culture of an organization before the deployment of Lean initiatives is paramount, as it helps managers and change agents to have a clear picture of the culture and find suitable ways and strategies to match it with the intended Lean initiatives to be deployed to ensure compatibility and effectiveness (Maull, Brown, & Cliffe, 2001). Therefore, deployment and implementation of Lean manufacturing lie in the organization's aptitude for a complete culture for change readiness through its several policymaking processes, operating systems, and human resources practices (Rad, 2006).

Similarly, it is of great importance to have a favourable culture to a Lean environment, one that emphasizes team effort and teamwork, capable of improving cohesion between various units, thereby enhancing the level of worker satisfaction in the organization (Wong & Wong, 2014). Furthermore, SMEs have a smaller size and fewer numbers of people that are naturally unified under mutual beliefs and values under the owner and manager; hence, it is relatively easy for SMEs to control the organizational culture to its advantage than larger organizations (Harel, Schwartz, & Kaufmann, 2020; Rymaszewska, 2014; Shams & Mahmudul, 2018). Further, SMEs have an organizational culture that is more organic culture compared to large organizations. Thus, SMEs are composed of a small number of people, usually joint under mutual values and beliefs, meaning that changing organizational culture can be easier (Tidor, Gelmereanu, Baru, & Morar, 2012).

2.2   Hypothesis Development

2.2.1   *Organizational Culture and Customer Relations*

Following the work of Rahimi & Gunlu (2016), organizational culture is a crucial factor in managing customer relations in businesses. Organizations must provide high-quality customer service by implementing customized practices to address customers' changing expectations (Nowak, 2019). It is argued that customer relation is the only aspect of management in which

SMEs can strive for equivalent footings or even have a more excellent lead over; larger organizations in the marketplace are that SMEs tend to be more flexible (Galvão, de Carvalho, Oliveira, & Medeiros, 2018). 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. A similar study aimed to examine the role of organizational culture and quality management on innovation among Nigerian manufacturing companies by mediating dynamic capabilities (Shuaib, He, & Song, 2021). The study finds that all the organizational culture dimensions and quality management practices are positively and significantly related to innovation.

Furthermore, the results show that dynamic capabilities played a positive and significant mediating role between organizational culture, quality management practices, and innovation (Shuaib et al., 2021). Therefore, it is vital to properly comprehend the role of organizational culture on customer relations to assess the level of interconnectedness that will lead to effective integration and a good foundation for Lean deployment (Inuwa & AbdulRahim, 2020; Sahoo, 2022). Also, it is suggested that studies should empirically test the relationship between organizational culture and customer relations (Antony et al., 2020; Yadav et al., 2019). Hence, the need for the hypothesis.

H1: There is a significant positive relationship between organizational culture and supplier relations

2.2.2   Supplier Relations and Customer Relations

To compete in today's highly changing business environment, it is sacrosanct to synergize with the best suppliers to appeal to customers (Avery & Bergsteiner, 2011). A committed organization should be capable of ensuring and creating balance in supply chain management so that beneficial supplier relationship is maintained. Customer demand is also met timely, which will, in turn, result in greater customer satisfaction and strong customer relations (Andraski, 1998). Previous scholars have asserted that a collaborative relationship between leadership and supplier is critical to achieving organizations' goals and objectives through customer demands being met timely (Hudnurkar & Rathod, 2017). Thus, meeting customers' needs timely which is seen as a precondition for lean deployment, SMEs should have an organizational practice that promotes an effective relationship with their respective suppliers and be highly competitive in terms of cost, quality, innovation, and delivery of their customers (Kumar, Singh, & Shankar, 2015).

Research conducted within manufacturing SMEs in Kuwait to assess Lean readiness by Al-Najem et al. (2019) reveals that supplier relations are crucial to having adequate readiness for change to Lean manufacturing. Similarly, research conducted within European pharmaceutical SMEs productions firms also finds that supplier relations are a critical readiness factor for the

deployment of Lean initiatives successfully (Garza-Reyes et al., 2018). Also, research conducted among Indian manufacturing SMEs to identify critical barriers and enablers for Lean deployment concludes that supplier engagement is one of the significant enablers for successful Lean deployment and implementation (Dora, Kumar, & Gellynck, 2016; Patel, Sambasivan, Panimalar, & Krishna, 2021). Supplier relations through collaboration significantly impact the just-in-time delivery of material in research carried out within Indian manufacturing SMEs (Antosz & Stadnicka, 2017a). Also, in South Africa, Makhitha (2019) conducted a study among SMEs to examine supplier relationships and performance; the findings reveal that information sharing with suppliers, collaborative relationships, and transactional relationships influence performance. 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 with 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 substantially impacts performance (Amole, Adebiyi, & Oyenuga, 2021).

H2: There is a significant positive relationship between supplier and customer relations.

2.2.3 Mediating Effect of Supplier Relations

For organizational readiness for change to be high and thoroughly assessed, organizations must have their internal operations integrated into the supply chain through good supplier relations, facilitating the delivery of qualitative raw materials on time. Supplier relations through an efficient and effective supply chain framework lessen wastage and optimally grasp opportunities in the best interest of customers, which is central to Lean deployment successfully (Wachira, Mburu, & Kiai, 2022). Working closely with suppliers from the early stages of product development will help to enhance process quality and reduce waste (Iranmanesh, et-al 2019). It is posited that firms focus on the supplier and that the timely availability of information plays a crucial role in the buyer-supplier relationship; hence firms should look for suppliers that can share information (Patyal et al., 2020).

Also, the strategic partnership allows firms to connect effectively with suppliers and share collaboration to ensure the product's success (Rasib, KalianiSundram, & Noranee, 2021). Manufacturers that practice Lean supply chain must sustain good relationships with their suppliers to realize the availability of raw materials, which will enhance supportive and integrated supplier relationships at a high level in exchanging information between manufacturers and their suppliers (Ariadi, Surachman, Sumiati, & Rohman, 2021). The delivery of raw materials on time with good organizational harmony will lead to manufacturing the required goods on time with minimal waste and shorter lead times, thereby meeting market demand, hence, a foundation for Just in Time (JIT) production (Hussein & Zayed, 2021). Supplier relations management is an environmental factor integral to Lean readiness and successful deployment; it allows organizations to comprehend external suppliers and align them with their processes to achieve just-in-time production (Vaishnavi & Suresh, 2020).

H3: Supplier relations positively and significantly mediate the relationship between organizational culture and customer relations.

2.3. Research Framework

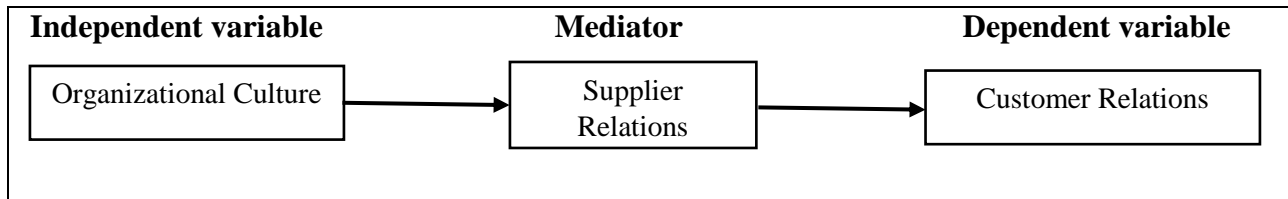| Independent variable	Mediator	Dependent variable
Organizational Culture →	Supplier Relations →	Customer Relations

Figure 1   Research Framework

3.1 Methodology

The research aims to examine the indirect effect of supplier relations on organizational culture and customer relations among manufacturing SMEs in Nigeria. The research is based on a positivist philosophy, which is quantitative and aims to test cause-effect relationships. Also, the paper followed a deductive research approach by administering the questionnaire to managers of manufacturing SMEs, which were later retrieved and analyzed using SMART-PLS 4. Further, the measurement for the organizational culture, the independent variable, nine items were adapted from the study of Tenji & Foley (2019). Organizational culture is operationalized as cultural traits and their relative contribution to assessing the readiness of firms to implement quality initiatives in the workplace (Tenji & Foley, 2019). The items were based on a 5-point Likert scale ranging from 1-5. For supplier relations, the mediating variable, comprising eight measures, was adopted from the study (Al-Najem et al., 2013). The items were based on a 7-point Likert scale from 1 to 7. Customer relations measurements were also adopted to the work of Al-Najem et al. (2013), which comprises six items. The items were operationalized based on a 7-point Likert scale ranging from 1-7.

Further, before the questionnaire administration, the research instruments have undergone thorough checks by experts in the field of quality management and SMEs to ensure that the questionnaire's content in terms of wording and understanding is appropriate for the research. Also, respondents' focus groups were selected to crosscheck the items for any observations and corrections. Afterwards, corrections were affected to ensure the quality of the questionnaire and avoid response bias. The study population cut across manufacturing SMEs in Nigeria; as contained in a survey report by SMEDAN/NBS (2017), there are 17,094 manufacturing SMEs in Nigeria. Manufacturing SMEs (organizations) are the unit of analysis in which SMEs Managers serve as representatives, considering manager's roles and responsibilities for daily decision making within their respective firms, as contained in a survey report by SMEDAN/NBS, (2017) as the population to determine the sample size. Therefore, in line with the study of Krejcie & Morgan (1970), a sample size of 375 is accepted to represent the population. Further, as Hair, Jr (2015) suggested, a sample can be increased by a certain percentage to handle the possible occurrence of a low response rate during data collection. In addition, Adomi, Ayo and Nakpodia's (2007) study shows that Nigerians are reluctant to fill out and return questionnaires.

Hence, 10% of 375 samples were added, which makes 414 questionnaires administered to ensure that we have the required responses for data analysis at the end of the day. Therefore, from the 414 questionnaires, 69 were allocated and distributed through convenience sampling to the respondents in each state of the selected six states (Bauchi, Kano, Plateau, Imo, Rivers, and the Osun States), the country's six geopolitical zones. Also, the researcher administers the questionnaire in person to the respondents using a cross-sectional research approach. Four hundred fourteen questionnaires were distributed, 337 were returned after following-ups, and 36 were not completed, including one univariate outlier. Consequently, three hundred (300) questionnaires were useful, indicating 72% of the total questionnaires distributed. Hence, Baruch (1999) states that social and management sciences research frequently has a 55.6% response rate. Likewise, others have considered a 60% good response rate o (Babbie, 2007; Grove, 2006). Following the debate, this study's response rate of 72% is quite tolerable and suitable for data analysis.

4.1   Data analysis

Data was entered using Statistical Package for Social Science (SPSS). Also, data screening was carried out to spot and confirm that the data is cleansed and can reflect the actual phenomenon of the study. After cleaning of data, descriptive statistics, frequencies, and percentages were used to analyse the demographic variables of the respondents, as presented in the table below.

Table 1.   Respondents Demographic Profile

Demographic Variable	Classification	Frequency	Percentage
Gender	Male	258	86
	Female	42	14
Total Valid		300	100
Working experience	Less than 5 years	135	55.0
	5 years and above	65	45.0
Total Valid		300	100
Qualification	Primary certificate	19	6.3
	Secondary certificate	90	30.0
	Diploma	57	19.0
	National Diploma	28	9.3
	Higher National Diploma	22	7.3
	Degree	67	22.3
	Masters	7	2.3
	Ph.D.	2	0.7
	Others	8	2.7
Total valid		300	100
Business category	Small	200	66.0
	Medium	100	34.0
Total valid		300	100
Nature of Business	Food and beverages	53	17.7

Plastic products	21	7.0	
Wood and furniture	44	14.7	
Soft drinks	17	5.7	
Textile and garments	33	11.0	
Metal fabrication	30	10.0	
Agro-processing	43	14.3	
Others	59	19.7	
Total Valid		300	100

Also, the issue of the common method is addressed by applying Herman's single-factor test as suggested by (Podsakoff, Mackenzie, Lee, & Podsakoff, 2003). The first factor accounts for only 24.5% of the variance, less than 50%, and the last factor accounts for 5589%, greater than 50%. Consequently, going to Podsakoff et al. (2003, 2012), where the first factor is less than 50%, and the last factor is greater than 50%, indicates that CMB is not spotted in this study.

Furthermore, the Partial Least Squares -Structural Equation Modelling (PLS-SEM) method using SMART PLS 4 is used in the model evaluation for this study, as opined by (Ringle, Wende, & Becker, 2015). Applying a two-stage analytical procedure consisting of (a) measurement models assessment and (b) evaluations of current structural models was applied after carrying out descriptive analyses (Anderson & Gerbing, 1988; Hair, Hult, Ringle, & Sarstedt, 2017).

4.1.1 Measurement Model Assessment

All constructs are based on reflective measurement; thus, assessing a reflective measurement model encompasses two main procedures: internal consistency assessment and convergent validity and discriminant validity assessment. Starting with the convergent validity, the indicator (items) reliability is expected to have an outer loading of 0.708 or higher. Conversely, loadings greater than 0.4, 0.5, 0.6, and 0.7 are all acceptable, provided that the average variance extracted (AVE) and composite reliability CR threshold 0.50 and 0.70 are all satisfied. Using the Hair et al. (2014) criteria, items with loadings lower than five were deleted. Both CR and AVE meet the required threshold, as presented in the table below.

Table 2.   Convergent Validity

Constructs	Items	Loading	CR	AVE
Customer Relations	CR1	0.766	0.873	0.534
	CR2	0.704		
	CR3	0.684		
	CR4	0.724		
	CR5	0.796		
	CR6	0.705		
Organizational Culture	OC1	0.808	0.824	0.541
	OC2	0.743		
	OC4	0.683		
	OC5	0.701		
Supplier Relations	SR1	0.770	0.818	0.529

SR2	0.732
SR3	0.715
SR7	0.690

Note: Customer relations (CR), Supplier relations (SR), Organizational culture (OC)

As shown in the table above, customer relations (CR) have an AVE of 0.534 and composite reliability of 0.873. Organizational culture has 0.824 and 0.541 as AVE and composite reliability, respectively. Also, supplier relations have an AVE of 0.529 and composite reliability of 0.818. This shows that all the constructs and their respective indicators have an acceptable level of convergence. The figure below also presents the indicators' outer loadings in the measurement model.
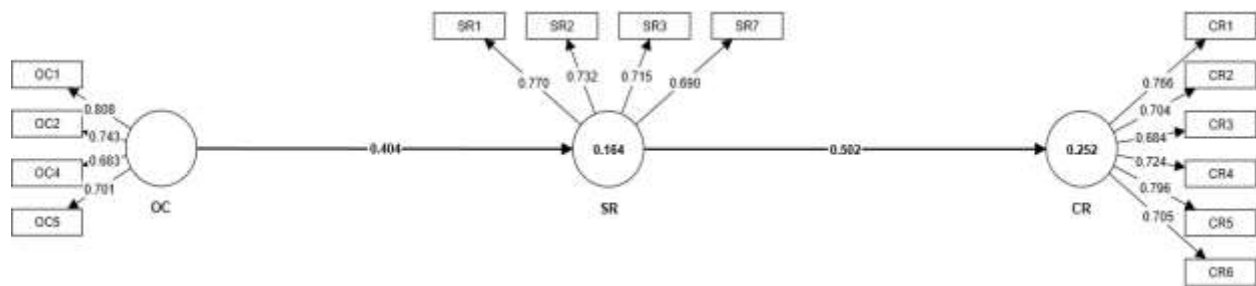

Figure 2.   Measurement Model

The fornell-Larker criterion is used to assess the discriminant validity. It relates the square root of the AVE values with the latent variable correlations. The square root of each construct's AVE should be greater than its highest correlation with any other construct. Using the Fornell–Larcker criterion, the AVE square root should be higher than the corresponding vertically and horizontally (Hair et al., 2011). As presented below, all constructs have met the discriminant validity threshold.

Table 3.   Fornell-Larker criterion

Construct	CR	OC	SR
Customer Relations (CR)	0.731		
Organizational Culture (OC)	0.443	0.736	
Supplier Relations (SR)	0.502	0.404	0.727

However, recent studies have found that the Fornell-Larker criterion lacks the reliability to detect discriminant validity issues among constructs (Henseler, Ringle, & Sarstedt, 2015). It is maintained that when item loadings of a construct differ slightly (that is a minor difference), the Fornell-Larcker approach barely identifies the existence of discriminant validity (Hair et al., 2017). As a result of the above shortcomings, Henseler et al. (2015) proposed a more robust procedure known as Heterotrait-Monotrait Ratio (HTMT) for detecting discriminant validity among constructs. Henseler et al. (2015) assert that all the values above 0.90 depict discriminant validity issues. It is also the position of Gold, Malhotra, and Segars (2001). Similarly, Kline (2011) suggests that a value not above 0.85 also indicates the absence of discriminant validity. Hence, values for the HTMT fall within the acceptable threshold, as shown in the table below.

Table 4.   Heterotrait-Monotrait (HTMT)

Constructs	CR	OC	SR
Customer Relations (CR)	00000		
Organizational Culture (OC)	0.538	000000	
Supplier Relations (SR)	0.639	0.533	00000

4.1.2 Assessment of structural model

The structural model consists of coefficient determination (R^2), effect size (f^2), and variable inflation factor (VIF). Regarding R^2, it is argued by Hair et al. (2017) that there is no standard

threshold, while Hair, Sarstedt, Hopkins, & Kuppelwieser (2014) postulated that an R^2 at 0.20 is high in organizational studies. Therefore, it can be deduced that this study has achieved an acceptable R^2 of 0.252 effects on the endogenous construct of customer relations. Regarding effect size (f^2), Cohen (1988) asserts that 0.02, 0.15, and 0.35 are slight, moderate, and large effect sizes. Hence, any predicting construct having an effect size (f^2) value lower than 0.02 does not affect the related endogenous construct in the model. This study's effect size shows that organizational culture has 0.196 supplier relations. Also, supplier relations on customer relations have an (f^2) of 0.338. Hence, (f^2) all exogenous constructs have shown an acceptable effect size range (f^2) on the endogenous variables. The variance inflation factor (VIF) was used in assessing multi-collinearity among the constructs under investigation. Hair et al. (2019) suggested that VIF values should be close to 3 and lower. The result shows that the multi-collinearity assessment of organizational culture on supplier and customer relations is 1.00, respectively. It shows that the VIF values among all the constructs are lower than the threshold, which shows an absence of collinearity amongst the constructs of this study.

4.1.3 PLS Predict

To predict the value of a selected dependent construct's indicators, PLSpredict (Q^2 predict) uses the values for the independent constructs' indicators of cases in the hold-out sample and applies the model estimates from the training sample to generate a prediction of the dependent constructs' indicators (Shmueli et al., 2016). In the same vein, root mean squared error (RMSE) is used since the prediction error distribution is symmetric. The result shows that Q^2 predict values > 0, indicating that the model outperforms the most naïve benchmark. Further, the RMSE value with the LM (linear model) value of each indicator was compared with of PLS-SEM analysis to ascertain the level of predictive power. According to Shmueli et al. (2019), if the PLS-SEM analysis (compared to the LM) yields lower prediction errors in terms of RMSE for all (high predictive power), the majority (medium predictive power), the minority (low predictive power), or none of the indicators (lack of predictive power). Regarding this study, it can be said that the Q^2 prediction has shown a higher prediction error. Thus, the hold-out sample indicates high predictive power. Also, as shown in the table, there is a slight divergence between the actual and predicted out-of-sample case values (PLS-SEM – LM) RMSE. According to Shmueli et al. (2019) and (Hair et al. (2020) suggest that the model has medium predictive power, as shown in the table below.

Table 5. Q^2 Predict summary.

Indicators	Q²predict	PLS-SEM_RMSE	LM_RMSE
CR1	0.126	1.631	1.547
CR2	0.049	1.694	1.704
CR3	0.056	1.652	1.648
CR4	0.041	1.713	1.727
CR5	0.092	1.573	1.552
CR6	0.051	1.615	1.631
SR1	0.089	1.501	1.499
SR2	0.100	1.573	1.584
SR3	0.042	1.623	1.637
SR7	0.083	1.410	1.412

4.1.4 Path coefficients

As widely suggested in the literature, five thousand (5000) subsamples are used to run the bootstrapping procedure (Hair et al., 2017; Wong, 2013). The essence of this analysis is to test the significant effect of all the direct and indirect relationships hypothesized in the previous section. It is to confirm whether the data collected supports the hypotheses or otherwise. Studies suggested that values from 1.65 be significant at 10%, while 1.96 and 2.57 are also considered significant at 5% and 1% significance levels, respectively, based on two-tailed tests (Hair et al., 2017; Hair, Ringle, & Sarstedt, 2011; Hair et al., 2020). Similarly, the one-tailed test's critical values of 1.28 are significant at 10%, while 1.65 and 2.33 are significantly based on 5% and 1% significance levels, respectively (Hair et al., 2017). Hence, all the relationships hypothesized in this study are directional. Therefore, the one-tailed test was used. Organizational culture is found to have a positive and significant relationship on supplier relation with (β = 0.047, t-value = 8.640 and p<0.000). A positive and significant relationship was also found between supplier and customer relations with (β = 0.054, t-value = 9.248 and p<0.000). Additionally, supplier relations positively and significantly mediate the relationship between organizational culture and customer relations with (β = 0.039, t-value = 5.175 and p<0.000).

4.1.5 Importance-performance -Map analysis

This study carried out a post-doc importance-performance matrix analysis (IPMA) using customer relations as the target variable while organizational culture and supplier relations is the latent variables. IPMA analysis aims to identify constructs with high importance and low performance (Schloderer, Sarstedt, & Ringle, 2014). The outcome of the analysis aids top management in detecting areas that need more attention and improvement (Shafaei & Razak, 2015). Hence, scores for importance were extracted from the total effects of the estimated relationships in the structural model. Similarly, the performance scores or index values computation was conducted by rescaling the latent variables score to range from 0 as the lowest

performance to 100 as the highest performance. The goal is to identify predecessors that have a relatively high importance for the target construct but also a relatively low performance (Teeluckdharry, Teeroovengadum, & Seebaluck, 2022).

Moreover, the IPMA diagram below shows that supplier relations in the right area of the importance-performance map have a high importance (0.502) and performance (65.899) for the target construct, customer relations. Hence, it shows that management needs to sustain and improve supplier relations to enhance customer relationships. Organizational culture indicates lower importance (0.203) and   performance (60.273) relative to the supplier relations in the importance-performance map, indicating a lower priority for performance improvements. Therefore, investing in the performance improvement of organizational culture construct that has minimal importance for the target construct (customer relations) would not be logical since it would have little impact in improving the target construct (Hair et al., 2017).

Figure 3.   Importance-performance -Map analysis

5.0   Discussion and Research Implication

The study examines the relationship between organizational culture and customer relations through the mediating effect of supplier relations within manufacturing SMEs. It aimed to analyze their (SMEs) readiness to deploy lean manufacturing practices successfully. The findings of the H1 reveal that organizational culture has a positive and significant effect on supplier relations. The findings correspond with the study of (Eniola et al., 2019; Rahimi & Gunlu, 2016). The findings show that manufacturing SMEs in Nigeria have positive cultures

that significantly impact relationships with suppliers, leading to timely delivery of raw materials and a good foundation for just-in-time (JIT). Hence, a higher level of readiness to deploy successfully. The findings may be due to the organic culture of SMEs; they are known to have a simple organizational culture with flatter hierarchies which enhance faster decision-making. Also, H2 shows that supplier relations positively and significantly influence customer relations within manufacturing SMEs in Nigeria. The finding aligns with the studies (Ajayi et al., 2021; Antosz & Stadnicka, 2017). The finding shows that manufacturing SMEs' supplier relations practices in Nigeria enhance customer relationships.

The finding is a result small size of SMEs and few customers and suppliers, which made an easier exchange of information and faster decision-making processes. The indirect effect of supplier relations on organizational culture and supplier relations (H3) is also positive and significant. The finding supports the positions of Patyal et al. (2020), which state that firms focus on reliable suppliers to ensure information sharing, which plays a crucial role in the buyer-supplier relationship; hence firms should look for suppliers that can share information. The finding also relates to the study of (Ariadi et al., 2021). Regarding the IMPA, it has shown; further manufacturing SMEs have given adequate attention to supplier relations indicating a strong synergy with their respective supplier. The IMPA findings are not surprising as manufacturing SMEs know fewer suppliers to deal with, making supply chain management less complex. It is therefore advised that SMEs maintain and sustain good relationships with suppliers by sharing relevant information that helps further enhance the speedy delivery of high-quality raw materials to meet and exceed customer expectations.

 The study has provided insight to SME managers willing to implement lean to understand relevant key areas (organizational culture, supplier relations, and customer relations) that require assessing lean readiness. Manufacturing SMEs managers can utilize the study's findings to achieve higher lean readiness and successful deployment. Hence, mitigating the chances of failure. Theoretically, the study shows that supplier relations as an indirect construct of organizational culture and customer relations is essential, contributing significantly to lean readiness research. The application of IPMA has offered a methodological contribution to lean and quality practices research. The use of IPMA can greatly help SME managers understand which readiness factor requires improvement and priority in ensuring that lean readiness is fully assessed and examined within their organization.

5.1   Conclusion and Recommendations for future research

Based on the discussions, the study concludes that manufacturing SMEs in Nigeria have a greater readiness to deploy lean within their organizational success. It is therefore suggested that SME managers channel their resources to ensure that lean initiatives are deployed to tackle the issues of wastage and poor product quality. Achieving quality to lean deployment should be the SME's priority. Future researchers can add additional variables to achieve organization-wide lean readiness assessment. Fund availability is sacrosanct in successful lean deployment; therefore, future studies can use it as moderation or mediation. Also, the service sector is understudied as the current study focuses only on manufacturing SMEs.

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