Research Article

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Organizational Integration, Knowledge Management, and Sustainable Entrepreneurship for SMEs in Developing Economies

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Abstract: This study underscores the indispensable role of knowledge management (KM) in promoting sustainable entrepreneurship (SE) among small and medium-sized enterprises (SMEs) in developing economies. SMEs, being the backbone of various facets of society, including employment rates, gross domestic product growth, innovation, social cohesion, economic development, growth, and public policies, should be considered. SE is a pressing issue for low- and high-income countries and developed and developing economies. The study utilized a self-administered questionnaire to gather data from 490 SMEs operating in different commercial regions and industries, providing a large-scale empirical study that fills gaps in the existing literature. The study highlights the significance of KM processes in facilitating organizational integration (OI) activities, which positively influence the SE practices of these SMEs. The research offers practical recommendations for SMEs to foster SE through effective KM practices and OI strategies. Moreover, the study provides valuable insights for future research in this area. The findings of this study have substantial implications for policymakers, practitioners, and researchers seeking to enhance the entrepreneurial landscape in developing economies.

Keywords: organizational integration (internal and external), knowledge management, sustainable entrepreneurship, small and medium-sized enterprises, developing economies

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1 Introduction

Small and medium-sized enterprises (SMEs) are vital to the economies of most countries, particularly emerging markets. They are significant contributors to employment, poverty reduction, export growth, foreign direct investment, and the creation of policies that support entrepreneurship and business ownership (Al-Haddad et al., 2019). In Nigeria, SMEs account for 50% of the national GDP, 96% of businesses, and 84% of employment (Umar et al., 2020). SME development is a global priority, as the World Bank estimates that by 2030, nearly 600 million jobs will be needed to accommodate the growing global workforce (Umar et al., 2020). These projections underscore the importance of providing research and resources to ensure SMEs' growth, development, and sustainability in emerging economies. The significance of SMEs to economies has led to extensive research on leadership, management, operations, and development in SMEs (Gavurova et al., 2020; Madanchian & Taherdoost, 2017; Vuhuong & Edwards, 2022).

SMEs play a significant role in economic growth in Nigeria and other emerging economies. However, their survival is becoming a growing concern, and their success depends on effective management, environmentally friendly strategies, and supportive regulations and policies (Abayomi & Bakare, 2019). The theory of dynamic capabilities highlights the importance of SMEs integrating their resources to gain a competitive edge (Baskerville & Dulipovici, 2006). This study looks at the connection between organizational integration (OI) and sustainable entrepreneurship (SE) for SMEs and how knowledge management (KM) influences these variables. OI is critical because it helps SMEs use KM processes to create and acquire knowledge from internal and external sources. This knowledge is then integrated into their operations and systems for better performance (Bratianu, 2013). KM is crucial in coordinating and managing organizational and individual knowledge in both existing and new competitive environments. This is essential for improving innovations that help SMEs achieve better performance

and a sustainable competitive edge (Abbas et al., 2020; Hassan & Raziq, 2019).

The United Nations-World Bank Group has recently announced the 2030 Agenda, which aims to promote sustainable economic growth and inclusive development for all (The United Nations-World Bank Group, 2018). However, despite the significant contributions of SMEs to economic growth, their survival in Nigeria and other emerging economies is a growing concern. Their survival depends on effective management, economic and environmentally friendly strategies, and regulations and policies that enable organizational growth (Abayomi & Bakare, 2019). The dynamic capabilities theory helps us understand the importance of organizations intentionally integrating and combining their resources to gain a competitive edge for survival (Baskerville & Dulipovici, 2006). As such, various studies have examined the different dimensions of KM for organizational development (Abbas & Sağsan, 2019), product and service development (Mardani et al., 2018), innovative effectiveness (Yusr et al., 2017), operational management (Almahamid & Qasrawi, 2017), and as a resource for strategic competitiveness (Bolisani & Bratianu, 2018). Despite a prior recommendation to examine the roles of KM in SMEs across various businesses (Qader et al., 2022), there is still a gap in the literature on the applicability of KM processes and SE for small businesses in particular.

This study addresses the research gap in Sub-Saharan Africa, particularly in Nigeria, by examining the economic level and multi-industry studies on SMEs engaging in OI for SE through KM. To our knowledge, no such studies have been conducted in this context. The purpose of this study is to explore the development of OI within SMEs in Nigeria and the use of KM practices to foster SE. Drawing on knowledge-based theory, dynamic capabilities theory, and stakeholder theory, we analyze how internal and external OI factors influence SMEs to achieve OI. Additionally, the study explores how the influence of KM can contribute to the establishment of sustainable organizations and promote economic and environmental development.

This research delves into the relationship that exists between OI and SE in SMEs, with KM serving as a mediator. The study seeks to explore how KM can impact the relationship between OI and SE by analyzing various businesses across diverse industries. OI is a critical factor in organizations as it enables the creation and acquisition of knowledge from both internal and external sources, which can then be integrated into organizational systems to enhance performance (Bratianu, 2013). KM plays an indispensable role in coordinating and managing organizational and individual knowledge in both established and new competitive environments, and this is a crucial factor in enhancing innovation and achieving sustainable organizational performance while also gaining a competitive edge (Abbas et al., 2020; Hassan & Raziq, 2019).

The results of this study provide significant contributions to two main areas. First, they offer valuable insights and guidance to SMEs on enhancing their KM capabilities. This will promote SE by encouraging the adoption of OI strategies to engage both internal and external stakeholders effectively. Previous studies have touched on the importance of sustainability in establishing organizational relationships (Pero et al., 2017), engaging different participants (León-Bravo et al., 2017), and the factors influencing sustainable activities such as coordination, communications, and technological integration within organizations (Gmelin & Seuring, 2014). However, this study addresses a critical research gap using empirical evidence to examine the relationship between internal and external OI regarding SE and KM. Therefore, this research expands existing knowledge and provides valuable insights into this specific research area.

This study explores the impact of SMEs in various industries in Nigeria on sustainable development. It also investigates whether KM plays a role in how OI can lead to SE. Additionally, it examines how KI can contribute to establishing sustainable organizations and promoting economic and environmental development. The article is structured as follows: Section 2 reviews the literature on KM in SMEs, OI, and SE, and Section 3 develops theoretical justifications and hypotheses. Section 4 outlines the research sampling, structural model, and measurement items. Section 5 presents statistical data, results, and hypothesis testing. Finally, Section 6 discusses the hypothesis results, highlighting theoretical contributions, economic and managerial implications, limitations, and recommendations for future research.

2 Literature Review

2.1 SMEs in Developing Economies

SMEs play a significant role in economies worldwide. They create employment opportunities, contribute to the GDP, foster innovation and social cohesion, drive economic growth, and shape public policies. SMEs contribute, on average, 40% of GDP and 50% to employment for low-income and developing economies (Koreen et al., 2018; Verdolini et al., 2018). Despite the plethora of studies on SMEs, there is still a pressing need for more research on SE among SMEs and their potential to drive economic growth

and sustainability in developing economies (Ndeye Ndiaye et al., 2018). Properly managed and sustainable SMEs in developing economies like Nigeria are significant sources of wealth creation and employment opportunities. They provide income for the people and generate revenue for the government through taxes. Their contributions to economic development come through innovation, production, and services (Verdolini et al., 2018). SMEs also play an essential role as stakeholders for big organizations. They assist in advancing and deploying technology, which encourages healthy competition among large corporations and ultimately leads to positive economic outcomes. The intense competition in the marketing landscape of emerging economies significantly impacts the growth and sustainability of SMEs, which plays a crucial role in shaping the region's economic development. This is because entrepreneurship is a catalyst for change that transforms knowledge and resources into innovative and valuable products and services that contribute to community development (Etuk et al., 2014). This study examines how external and internal factors and stakeholders impact the performance and sustainability of SMEs in developing and emerging economies like Nigeria (Ipinnaiye et al., 2017). For SMEs seeking to enhance their performance over the long term, it is beneficial to partake in endeavors that foster knowledge exchange with internal and external parties, and this can involve various activities that enable the sharing of insights, expertise, and best practices, thereby enhancing the organization's capabilities and competitiveness. By engaging with stakeholders collaboratively and openly, SMEs can unlock new opportunities, solve problems more effectively, and build stronger relationships with key partners (de Zubielqui et al., 2015).

2.2 KM in SMEs

SMEs must prioritize effective KM in order to ensure their survival (Abbas et al., 2020; Rao et al., 2022). McAdam and Reid (2001) conducted a study comparing SMEs to large organizations. Their findings showed that both sectors could gain significant advantages through implementing KM. Other studies, like Salojärvi et al. (2005), observed that SMEs can enhance their competitive edge and overall performance by adopting more organized and effective KM processes. These processes arrange knowledge non-hierarchically and help SMEs comprehend KM functions (Sağsan, 2006). The benefits of KM depend on how well knowledge is measured and utilized, allowing for effective market positioning and overall success for the organization (Fink, 2004). SMEs' success and competitive advantage rely not only on coordinating tasks and managing information but also on integrating different knowledge functions effectively and efficiently (Purvis et al., 2001). SMEs should have a basic understanding of knowledge operations and infrastructures to support organizational operations (Abubakar et al., 2019).

Although there is a widespread acknowledgment of the importance of knowledge in the activities of SMEs and the role of organizations in integrating knowledge, there is still a need for a deeper understanding of how KM formation and processes can be applied in the context of SMEs in order to promote sustainability (Brown & Duguid, 2001; Takeishi, 2002). However, previous studies have identified the processes of KM, starting with the identification of links between the stakeholders and the knowledge sources (knowledge acquisition) (Fink & Ploder, 2009; Gold et al., 2001; Nielsen, 2006), distributing acquired knowledge across boundaries of the enterprise (knowledge sharing) (Lauring & Bjerregaard, 2009; Ling et al., 2008; Yang, 2005), interpretation of the distributed knowledge within an enterprise (knowledge assimilation) (Song et al., 2005; Zahra & George, 2002), and finally concluding the KM processes by applying the interpreted and substantial knowledge to execute set tasks (knowledge application) (Gold et al., 2001; Lin & Lee, 2005). In previous studies, there has been a discussion about the importance of knowledge beyond just combining what has been learned with what is already known. This study suggests that KM involves acquiring and processing different sources of internal and external knowledge to effectively communicate ideas, share culture, store information, and generate solutions to complex problems or carry out specific organizational tasks (Cocca et al., 2021).

2.3 OI

All organizations comprise various units with differing beliefs, skills, and approaches. They operate in a competitive environment that is unique to them. The merging of these differences toward the organization's goals requires OI. OI refers to how well the different units of an organization can adapt, work together, and respond to achieve the organization's goals and objectives. It requires a level of compatibility and responsiveness appropriate and effective for the organization's specific needs (Barki & Pinsonneault, 2005; Ricciardi et al., 2018). The process of OI promotes information sharing between different organizations, breaking down boundaries (López-Sáez et al., 2021). In 1996, Grant's study revealed that the integration efficiency of an organization depends on how well its members and units can

understand and use the knowledge shared by other stakeholders within and outside the organization's boundaries. This study classifies the operations of OI into internal (within the organization's boundaries) and external (outside the organization's boundaries).

Internal OI refers to the cooperation, communication, and connections between different units, teams, and individuals within a company to accomplish its objectives and goals. Internal OI also refers to an enterprise's ability to coordinate and manage its practices and processes in a participative and manageable manner, allowing for consistent improvement in organizational performance, customer satisfaction, and sustainability (Chen & Paulraj, 2004). This research centers on three critical internal OI strategies that help organizations effectively acquire and process knowledge within their organization. These strategies include employee participation (Marin-Garcia et al., 2008), aligning rewards and objectives (Flynn & Flynn, 2004; Scott et al., 2003; World at Work, 2007), and implementing cross-functional teamwork (Chen & Paulraj, 2004; Curkovic et al., 2000). SMEs can benefit from OI by acquiring the knowledge of individuals, teams, and units. This can aid in KM processes, increasing productivity and promoting SE within the organization (Griffin, 1997; Kordab et al., 2020). Moreover, an organization's capability to utilize external knowledge at the right time and location is crucial. Many businesses are undergoing a shift in their external environments from an industrial paradigm characterized by uniformity, national markets, and a low rate of technology to a post-industrial paradigm, resulting in unforeseen and uncertain market changes, dynamic global competition, and rapid technological innovation (Jackson, 2004). Enterprises are motivated by significant external changes to adjust their operational activities consistently, managerial ideologies, practices, organizational culture, and structure, referred to as external OI in this study (Nahm & Vonderembse, 2002). In a paradigm like this, enterprises must prioritize implementing external OI operations, specifically those involving customers, suppliers, and information technology. Such operations open the enterprise to external knowledge, empowering them to adapt their core competencies to meet sustainability requirements (Bennet & Bennet, 2000; Von Krogh et al., 2000).

2.4 SE

SE has recently been given a clear definition (Halberstadt et al., 2019; Muñoz & Cohen, 2018). Fichter and Tiemann (2018) classified SE into two categories: creating business opportunities and maintaining organizational continuity. Furthermore, SE involves connecting entrepreneurial events and activities to achieving economic, social, and environmental goals based on sustainable ideals, morals, and values (O'Neill et al., 2009). SE can be described as the process of examining the market, identifying environmental gaps and their sustainability implications, assessing and capitalizing on these gaps, and ultimately transforming them into economic opportunities (Pereira et al., 2023). SE is a business practice that aims to achieve profitability while also considering social, environmental, and economic concerns. Its purpose is to contribute to sustainable development by promoting the triple bottom-line approach. This approach integrates social, environmental, and economic sustainability into the management, operations, and communication of SMEs (Abbas & Sağsan, 2019; Jayaratne et al., 2019).

Each aspect of SE plays a significant role. The social aspect focuses on improving the organization's relationship with society by promoting social equity, culture, human rights, and well-being (Guerrero-Villegas et al., 2018). The economic aspect aims to increase profitability while maintaining efficient operational costs. The environmental aspect involves preserving the environment, participating in the fight against water and air pollution, and ensuring environmentally friendly production facilities (Crecente et al., 2021; Lucas, 2010). Sustainable entrepreneurs possess a profound understanding of how the maximization of knowledge and the identification of opportunities contribute to the establishment of new businesses, enhanced market value, and the discovery of potential goods and services (Qader et al., 2022). Furthermore, Diepolder et al. (2021) highlighted the potential of SE in enabling SMEs to leverage their dynamic capabilities, fostering the development of sustainable entrepreneurial qualities both within and beyond organizational boundaries. Given the increasing demand for empirical studies investigating the applicability of competencies in SE, this research aims to explore the utilization of KM in OI as a means for SMEs to achieve SE. By integrating theories such as knowledge-based resources and dynamic capabilities, this study seeks to shed light on how SMEs can effectively leverage their knowledge assets to drive OI and ultimately ensure SE.

3 Theoretical Justification and Hypothesis Development

3.1 OI and SE

Establishing an organization serves the primary purpose of creating and delivering products or services to the

community it serves. In order to ensure sustainability, organizations must prioritize continuity in their practices, relationships, development, and integration models, as highlighted by resource-based theory (Schaltegger et al., 2014). According to stakeholder theory, organizations aiming at achieving successful and sustainable business operations must prioritize integrating the expectations, opinions, and intentions of its stakeholders both internal and external (Freeman, 1994). Previous studies have examined and identified the compatibility between stakeholders and sustainability in an organizational framework (Bellantouno et al., 2016). By adopting OIs (internal and external), SMEs can enhance their relationships and pave the way for long-term sustainability (Ramanathan et al., 2014), aligning with stakeholder theory. In the context of SE, identifying significant factors such as performance (Pero et al., 2017), decision-making (Swanson & DeVereaux, 2017), and innovation (Klewitz & Hansen, 2014) becomes crucial for SMEs. A comprehensive understanding of SE also emphasizes the responsibility of organizations to not only address the needs of internal and external stakeholders but also consider the well-being of society and future generations (Crals & Vereeck, 2004). Building upon previous studies, this research study puts forward the following hypotheses in order to further investigate the relationship between OI and SE:

Hypothesis 1
Internal organizational integration activities influence sustainable entrepreneurship in SMEs.

Hypothesis 2
External organizational integration activities influence sustainable entrepreneurship in SMEs.

3.2 KM and OI

Organizations can process knowledge from both internal and external stakeholders (Mirfakhreddini et al., 2010; Mirzaie et al., 2019). KM plays a pivotal role in facilitating effective operations and generating competitive advantage for organizations (Hung et al., 2008). Building on this notion, the OI approach adopts inter-organizational strategies that emphasize collaboration, interaction, and cross-functional activities (Kahn, 1996). These activities foster collaboration between different departments within an organization, while interaction focuses on the exchange and dissemination of information among operational units, departments, and external stakeholders (Hung et al., 2008). The theory of the knowledge-based view (KBV) explains that organizations can effectively gain a competitive edge in the global market by leveraging knowledge as a valuable tool. This approach is supported by noted scholars such as Barney (1991) and Grant (1996). By prioritizing knowledge acquisition, management, and dissemination, organizations can position themselves to better understand and address competitive challenges, as well as identify new opportunities for growth and expansion. With a focus on knowledge-based strategies, organizations can unlock new levels of success and thrive in today's dynamic and ever-evolving business environment. By integrating insights from the KBV theory, it becomes evident that KM serves as a unifying force, enabling organizations to engage with various stakeholders and leverage their collective expertise for improved performance and sustainable success. According to Grant's (1996) research on KM, organizations have a significant responsibility to effectively manage and integrate knowledge, as it directly impacts their ability to innovate, create value, maintain sustainability, and improve productivity (Hung et al., 2008; Huggins & Thompson, 2015; Yan, 2018). To achieve growth and development, organizations must gather knowledge from both internal and external sources. Additional studies suggest that organizations should prioritize implementing a KM system for all their operations, activities, and relationships (Huang & Lai, 2012; Talebi et al., 2012). In line with these studies, we posit our hypothesis as follows:

Hypothesis 3
Internal organizational integration activities influence knowledge management.

Hypothesis 4
External organizational integration activities influence knowledge management.

3.3 KM and SE

KM processes, encompassing acquisition, assimilation, sharing, and application, play a vital role in promoting sustainability and maximizing organizational potential, as advocated by the KBV theory (Mirzaie et al., 2019). KBV posits knowledge as a significant tool to be used by organizations to gain a competitive edge in a vast global market (Barney, 1991; Grant, 1996). Previous studies have explored the role KM plays in achieving innovation (Huang et al., 2022), environmental sustainability (Song et al., 2005), exchanging information (Chamba-Rueda et al., 2021), and organizational strategies for sustainability (Chaithanapat et al., 2022). For SMEs aiming to achieve sustainable and innovative entrepreneurship, accessing both technological

and scientific knowledge serves as a valuable resource (Ivanova & Latyshov, 2018; Malerba & McKelvey, 2019). Numerous studies have also highlighted the significance of steps in KM processes (Wee & Chua, 2013), including acquisition (Mirzaie et al., 2019; Malerba, 2010; Turner & Pennington, 2015; Zahra, 2015), sharing (Malerba & McKelvey, 2020), assimilation, and application (Malerba & McKelvey, 2020; Olugbola, 2017; SMEDAN, 2022) in fostering effective sustainability within organizations. In order to facilitate knowledge assimilation required for organizational development and integration and thereby ensure sustainability, it becomes imperative to formulate policies and strategies that establish connections between KM processes and SE for SMEs (Malerba & McKelvey, 2020). In contrast to traditional entrepreneurship, which emphasizes the interests of shareholders, and drawing from stakeholder theory, SE places a greater emphasis on fulfilling the needs of stakeholders by incorporating economic, environmental, and social considerations for sustainable development (Rosário et al., 2022). By ensuring effective KM, organizations can create opportunities for integrating sustainability, thereby fostering a more sustainable approach (Lis & Ptak, 2022). This study provides a unique empirical approach to the mediating role of KM affecting OI for SE in SMEs. Therefore, we propose the following hypotheses to further explore the interplay between KM, SE, and OI:

Hypothesis 5
Knowledge management processes influence sustainable entrepreneurship.

Hypothesis 6
Knowledge management processes mediate the relationship between organizational integration and sustainable entrepreneurship.

Hypothesis 6a
Knowledge management processes mediate the relationship between internal organizational integration and sustainable entrepreneurship.

Hypothesis 6b
Knowledge management processes mediate the relationship between external organizational integration and sustainable entrepreneurship.

4 Research Methods

Based on information in the available literature on the definitions of principal variables, this study is aimed to examine the understanding of the relationships to which SMEs can integrate within their organizational operation and the benefits of KM processes that will enable SE. This study will test how KM processes affect OI and SE as represented in the research model in Figure 1.

4.1 Sampling

This research follows a deductive approach, aiming to test hypotheses derived from existing theories. To accomplish this, we utilized the survey method to examine our hypotheses. We conducted a cross-sectional study, employing a convenience sampling technique targeting SMEs from various industries and regions in Nigeria, which is a sub-Saharan country.

According to the 2021 MSME Survey Report of the Small & Medium Enterprise Development Agency of Nigeria and the National Bureau of Statistics for 2020 (SMEDAN, 2022), there are a total of 39.7 million SMEs in Nigeria. This study employed a time lag methodology to gather the required data (Brislin, 1970), which took place between December 2020 and April 2021. As of this timeline, the study focused on participants from the states with the highest distribution of businesses among all the 36 states in Nigeria; Lagos (91,097 entities), Rivers (84,613 entities), and Kano states (79,328 entities). These states are highly commercial states and have contributed majorly to economic development in Nigeria, whose major sectors (manufacturing, services industry, agriculture, construction, and technology) were examined in this study. Lagos was the first capital of Nigeria between 1914 and 1976, after which it became recognized as a commercial capital (Wolpe, 1974). Port Harcourt, Rivers State, since 1965, has been a major source of petroleum production in Nigeria and one of the largest industrial regions (Ivanova & Latyshov, 2018). These states were also selected for study because they represent 50% of the geo-political regions of Nigeria; South West, South-South, and North West (Huang & Newell, 2003).

The survey helped to determine the level to which SMEs engage in OI, KM capabilities, and SE activities. The research respondents were managers and supervisors of SMEs who confirmed to take part in the study. Information regarding the classification of the type of business ownership, sole proprietorship, partnership or corporation, and years of establishment was also obtained.

The study collected data from participants using a non-probability convenience sampling method. An online survey distribution application was used to send out online survey links to the email accounts of 1,000 SMEs. This was accompanied by a letterhead to managers and supervisors

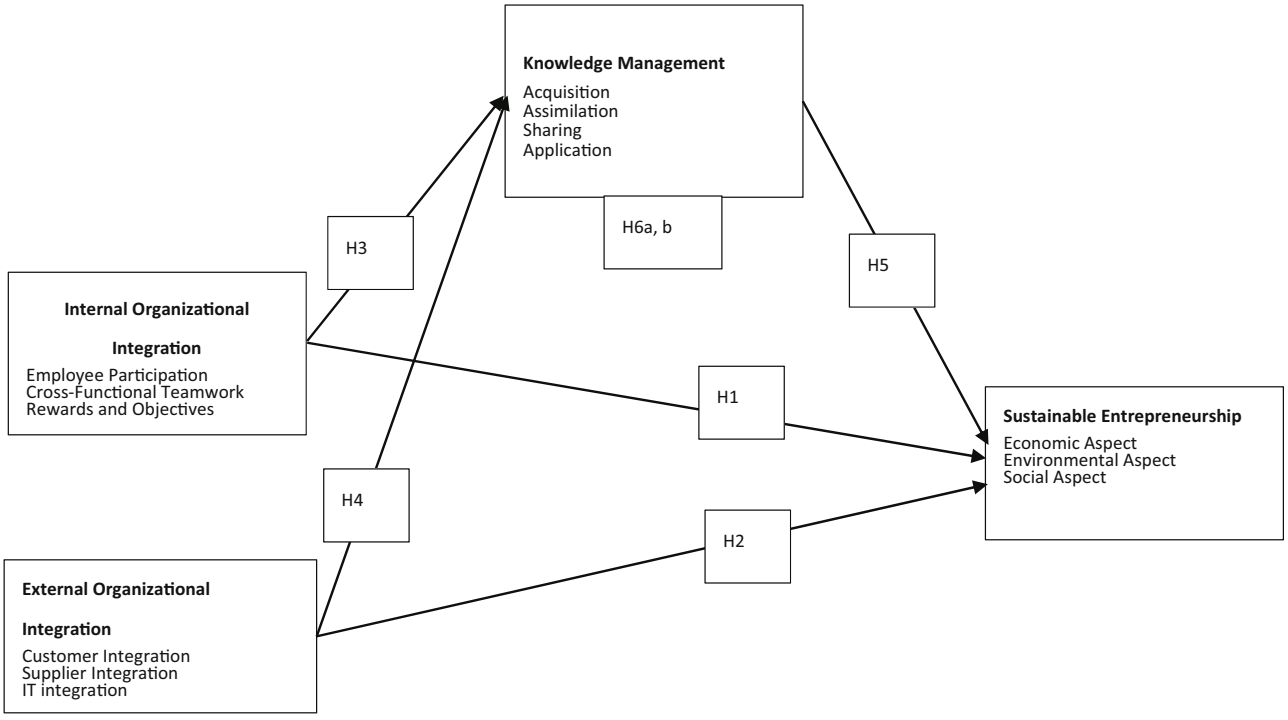

Figure 1: Research structural model.

for the purpose of transparency. Out of the 1,000 questionnaires emailed out, 614 were received back, and 124 incomplete responses were rejected. The collected data were checked for missing values, and of the responses, 80% provided suitable analysis of data. A total of 490 SMEs completely responded to the questionnaires (80%), and the statistical characterization is represented in Table 1. Studies can be based on national, institutional, enterprise, industry, or community; it depends on the topic and scope of the study. Studies should have defined priorities, especially when they are below the global level but can definitely invoke better understanding and have an impact on global change. As an imperative one, this study provides additional knowledge on how a country could make a considerable contribution to economic development and global change. Hence, Nigeria is in need of more representation in rigorous research and literature; this study is aimed at helping to close that gap and give direction to future investigations.

4.2 Measures

To examine the effects of OI in SMEs, we reviewed and modified measurements extracted and developed from previous studies and literature using a 5-point Likert scale, to which 1 is "strongly disagree" and 5 is "strongly agree" for each item. The measurements of OI were classified into two categories: internal integrations that were subdivided into cross-functional teamwork, developed from the studies of Chen and Paulraj (2004), Cua et al. (2001), and Koufteros et al. (2005); employee participation was developed from the studies of Marin-Garcia et al. (2008), Nahm et al. (2004); and rewards and objectives alignments were developed from the studies of Flynn and Flynn (2004) and Scott et al. (2003). The next is external integration, which is based on existing studies, and the literature was also subdivided into customer integration, developed from the studies of Frohlich and Westbrook (2001) and Swink and Song (2007); supplier integration adopted from studies of Alavi and Leidner (2001), Cua et al. (2001), and Prasad et al. (2005); and information technology developed from the studies of Molina et al. (2007). Second, the items used for measuring KM were developed and modified from existing studies on KM that include Fink and Ploder (2009), Hung et al. (2008), Hansen (2002), Javernick-Will (2012), Koe et al. (2014), Lauring and Bjerregaard (2009), Ling et al. (2008), Nielsen (2006), and Song et al. (2005). Finally, the items for SE and all its subdivisions were adopted from the studies of Briones Penalver et al. (2018) and Concepción et al. (2023). A detailed description of the measurement items is provided in the appendix. After data collection, we proceeded to perform analysis to ascertain the frequency of responses, correlation analysis, validity and reliability (confirmatory

Table 1: Statistical characterization of respondents (N = 490)

Division	Items	Frequency	%	Division	Item	Frequency	%
Industry	Servicing	156	31.84	Locations	Kano	118	24.08
	Manufacturing	27	5.5		Lagos	225	45.92
	Construction	34	6.94		Port-Harcourt	27	5.51
	Agriculture	69	14.08		Other	120	24.49
	Technology	204	41.83				
Business type	Sole Prop	253	51.64	Years of establishment	Less than 5 years	249	50.84
	Partnership	72	14.69		5–10 years	125	25.42
	Corporation	165	33.67		11–15 years	53	10.88
					15 years and above	63	12.86

The data reveal that the percentage of SMEs in the technology and services industry is high compared to other industries.

Table 2: Measurement model using explanatory factor analysis

Variable	Measurement indicators	Rotated component matrix				Alpha coefficient	Number of items
		1	2	3	4		
KM	Acquisition	0.916				0.931	4
	Sharing	0.909				0.912	4
	Assimilation	0.898				0.915	4
	Application	0.887				0.906	5
SE	Social aspect		0.953			0.851	4
	Economic aspect		0.950			0.850	4
	Environmental aspect		0.943			0.853	4
External integration	Supplier			0.969		0.800	4
	Customers			0.960		0.798	4
	Information technology			0.955		0.811	4
Internal integration	Cross-functional teamwork				0.930	0.828	4
	Employee participation				0.929	0.810	4
	Rewards and objectives alignment				0.872	0.823	3

Note: Cumulative dispersion explanatory power is 90.676%.

factor analysis and exploratory factor analysis), and structural equation modeling (SEM) for hypothesis testing. In order to achieve a statistical examination of the data, we utilized the statistical program SPSS (IBM SPSS Statistics 25) and AMOS (Version 23) statistic program.

5 Findings

5.1 Validity and Reliability Analysis

To test the reliability of the model in this study, we checked Cronbach's alpha coefficient and rotated the component matrix to conduct the exploratory factor analysis, which shows the internal consistency and the indicator loadings of our research. Whichever reliability coefficient is used, the value of the internal consistency that is >0.7 is considered as being satisfactory; however, any value that falls under <0.6 will be regarded as lacking reliability (Nunnally & Bernstein, 1994). The values of the alpha coefficients in this study fall within a minimum of 0.798 to a maximum of 0.931 range, as shown in Table 2, which demonstrates high reliability. Confirmatory factor analysis was also conducted and revealed the significance of the study. Table 3 illustrates the high value of the measurement loadings (λ), average variance extracted (AVE), and the composite reliability (CR) of the variables exceeding the benchmark values of 0.5 and 0.6, respectively. These data prove the analysis of the values estimated in the data accomplished convergent validity. In order to assess the discriminant validity and cross-loadings, the Fornell–Larcker criterion was employed as the primary method (Aiken et al., 1991). The Fornell–Larcker criterion is a widely recognized approach for evaluating the distinctiveness of constructs in a research model. By applying

Table 3: Confirmatory factor analysis

Variable	Measurement indicators	Loading (λ)	C.R	AVE	Number of items
KM	Acquisition	0.904	0.973	0.899	4
	Sharing	0.925			4
	Assimilation	0.981			4
	Application	0.981			5
SE	Social aspect	0.926	0.964	0.907	4
	Economic aspect	0.981			4
	Environmental aspect	0.950			4
External integration	Supplier	0.993	0.975	0.930	4
	Customers	0.958			4
	Information technology	0.941			4
Internal integration	Cross-functional teamwork	0.999	0.951	0.878	4
	Employee participation	0.916			4
	Rewards and objectives alignment	0.875			3

Note: Chi-square = 184.813 (do = 59), p = 0.000, GFI = 0.950, NFI = 0.980, CFI = 0.986, TLI = 0.982, RMR = 0.024, RMSEA = 0.066.

this criterion, Table 5 provides evidence that the current research model aligns well with the requirements for establishing discriminant validity. The discriminant validity analysis confirms that the constructs in the model are sufficiently distinct from one another, thereby ensuring the reliability and validity of the measurements used in the study.

5.2 Correlation Analysis

For the correlation analysis as presented in Table 4, we incorporated some demographic variables (e.g., location, industry, and business type) to test their direct or indirect impact on the variables of concern. The results revealed an interesting, significant relationship between the industry and type and location. It also revealed that OIs, KM practices, and SE were significant on the 0.01 (two-tailed) level.

5.3 Hypothesis Testing

We tested the hypotheses of this study using smart partial least squares-structural equation modelling (PLS-SEM), which consists of two stages. The first stage is the measurement model for refining and identifying the indicators (measures) for each construct. The second part is the structural model that helps analyze evaluation indicators: t-value and beta coefficient (β) (standardized path). A good model fit is expected to contain significant t-values and a satisfactory path coefficient. The results of the hypothesis testing in the structural equation modelling analysis are presented in Table 5.

5.4 Structural Equation Model Analysis

The structural equation model helps to understand the paths and relationships that have been hypothesized in

Table 4: Construct correlation mean values and standard deviations

Variables	Measurement indicators	01	02	03	04	05	06	07
01	Location	1	—	—	—	—	—	—
02	Industry	0.131**	1	—	—	—	—	—
03	Business type	−0.034	0.015	1	—	—	—	—
04	Internal integration	0.088	0.022	0.046	1	—	—	—
05	External integration	0.081	−0.005	0.086	0.051	1	—	—
06	SE	−0.048	−0.003	0.001	0.355**	0.130**	1	—
07	KM	0.063	0.017	0.000	0.479**	0.330**	0.433**	1
Mean		2.19	3.22	1.79	3.89	3.57	3.29	3.79
SD		1.05	1.74	0.91	0.82	0.84	1.02	0.92

**p < 0.01.

Table 5: Fornell–Larcker criterion

Variables	Measurement Indicators	CR	AVE				
01	Internal Organizational Integration	0.951	0.878	0.937			
02	External Organizational Integration	0.975	0.930	0.051	0.964		
03	SE	0.964	0.907	0.355	0.130	0.952	
04	KM	0.973	0.899	0.479	0.330	0.433	0.984

this research framework. The structural model is evaluated based on the R^2, Q^2, and path significance. The R^2 value of the dependent variables determines the integrity of the model by the strength of each structural path, where the value of R^2 should be equal to or greater than 0.1 (Falk & Miller, 1992). Table 6 shows the R^2 results, and they are over 0.1. This demonstrates predictive capability. Also, Q^2 establishes the predictive relevance of endogenous constructs. The results show Q^2 above 0 that indicates predictive relevance of the model. This shows that there is a significance in the prediction of the model constructs (Table 5). Additionally, the fit of the model was assessed using SRMR, which gave a value of 0.082. This signifies an acceptable fit of the model, as the value falls below the required value of 0.10 (Hair et al., 1998).

Hypothesis testing was assessed to determine the significance of relationships. The relationship between OI and SE was tested. H_1 tested if organizational internal integration (IOI) has a significant influence on SE. The result shows that IOI has an insignificant influence on SE (β = −0.014, t = 0.117, p = 0.907). H_2 tested whether organizational external integration (EOI) has a significant influence on SE. The influence of EOI on SE was insignificant (β = 0.169, t = 1.313, p = 0.109). Therefore, H_1 and H_2 were not supported. The relationship between OI on KM processes was tested. H_3 tested whether IOI has a significant influence on KM. The influence of IOI on KM resulted as positive and significant (β = 0.248, t = 2.179, p = 0.030). H_4 tested if EOI has a significant influence on KM. The influence of EOI on KM was positive and significant (β = 0.658, t = 6.157, p = 0.00). OI came out as having a statistically significant positive influence on KM capabilities. Therefore, H_3 and H_4 of the study were supported. Furthermore, the relationship between KM and SE was tested. H_5 tested if KM has a significant influence on SE. The results show a positive and significant relationship between KM and SE (β = 0.725, t = 7.009, p = 0.00), so H_5 was supported.

5.5 Mediation Analysis

Mediation analysis was tested to determine the mediating role of KM. The results (Table 7) revealed a positively significant and full mediating influence that KM plays between OI and SE. H_{6a} KM mediating EOI-SE (β = 0.447, t = 4.452, p = 0.000). Similarly, H_{6b} KM mediates IOI-SE (β = 0.180, t = 2.006, p = 0.039). KM plays a significant role in connecting OI to SE.

6 Conclusions

6.1 Summary of Research

This empirical investigation is a crucial study that delves into the immense benefits of establishing a highly efficient

Table 6: Structural equation modeling analysis and hypothesis results

	Hypothesis	β	SD	T values	p Values	2.5% CI	97.5% CI	Results
H_1	IOI > SE	−0.014	0.118	0.117	0.907	−0.241	0.230	Not supported
H_2	EOI > SE	0.169	0.129	1.313	0.109	−0.075	0.423	Not supported
H_3	IOI > KM	0.248	0.114	2.179	0.030	0.018	0.458	Supported
H_4	EOI > KM	0.658	0.107	6.157	0.000	0.475	0.863	Supported
H_5	KM > SE	0.725	0.103	7.009	0.000	0.529	0.920	Supported
	R^2	Q^2						
KM	0.769	0.480						
SE	0.746	0.470						

Table 7: Mediation analysis results

	Total effects	Sig	*T* value	Direct effects	*T* value	Sig	Relationship	Indirect effects	Sig	*T* value
EOI > SE	0.646	0.000	5.36	0.169	1.293	0.109	EOI > KM > SE	0.447	0.000	4.452
IOI > SE	0.166	0.235	1.189	−0.014	0.129	0.907	IOI > KM > SE	0.180	0.039	2.006

Note: ***p < 0.001 level (two-tailed); Fit indices: CMIN = 184.813 (df = 59), p = 0.000, CMIN/df = 3.132. Chi-square = 184.813 (df = 59), p = 0.000, GFI = 0.950, NFI = 0.980, CFI = 0.986, TLI = 0.982, RMR = 0.024, RMSEA = 0.066. IOI = Organizational internal integration, EOI = Organizational external integration, SE = Sustainable entrepreneurship, KM = Knowledge management.

KM system for managing both internal and external knowledge bases of organizations. With the implementation of this system, it guarantees the sustainable growth of SMEs in the highly competitive global market. The research collected extensive data from 490 managers and supervisors of SMEs in various regions across Nigeria and West Africa. To evaluate its effectiveness, the study model underwent rigorous testing using structural equation modeling. This study offers empirical evidence and contributes to our understanding of how SMEs can establish SE by leveraging KM processes to engage in OI activities. The concept of SE is gaining global recognition as a means to enhance business efficiency and effectiveness, thereby impacting the global economy. To further advance our knowledge in this area, more studies are needed to explore the tools and strategies that facilitate the achievement of SE.

The results in H_1 and H_2 revealed an insignificant direct relationship between internal and external OI and SE, and this provides room for further examinations of factors that will contribute to SE for SMEs. The implementation of OI serves as a crucial approach for SMEs to practice KM. This is supported by H_3 and H_4, indicating that SMEs engaging in cross-functional teamwork, employee participation, and activities aligned with rewards and objectives can acquire internal information, leading to enhanced overall performance through the generation and utilization of knowledge. Furthermore, SMEs actively involving their customers, suppliers, and information technology can obtain external knowledge, which is essential for gaining a competitive advantage in the market. To achieve these outcomes, SMEs are encouraged to allocate resources toward developing both internal and external OI activities for KM, aligning with the findings of Grekova et al. (2016). The findings of H_5 show that KM processes positively influence SE. These results concur with various studies on the role KM can play in an organization to developing sustainability (Arslan et al., 2022; Konno & Schillaci, 2021; Wang et al., 2006). The findings of $H_{6a\&b}$ clearly demonstrate that KM plays a mediating role in the relationship between internal and external OI and SE. The results indicate that they can foster sustainable entrepreneurial practices when SMEs effectively integrate their organizational processes and activities and combine them with KM practices of gathering and exchanging knowledge resources from internal and external stakeholders. This study contributes to the existing literature by providing empirical support for the role of KM in facilitating SE through OI among SMEs. It emphasizes the importance of OI and the adoption of KM processes to achieve sustainable entrepreneurial outcomes. Further research in this area can continue to explore additional tools and approaches that can aid SMEs in their pursuit of SE.

This study investigated how effective KM acts as a mediator in establishing a path from OI to SE, enabling SMEs to engage in KM processes for the creation and management of both new and existing knowledge. As stated by Penco et al. (2020), this can be accomplished by effectively leveraging knowledge acquired from internal and external sources through implementing OI, ultimately leading to creating a competitive advantage and ensuring success and survival. Initially, our study explored the direct relationship between OI and SE, but the results did not demonstrate significance. However, upon introducing KM as a mediator, a significant influence on the relationship between OI and SE was observed. Hence, the findings of this study support the notion that implementing OI practices enables SMEs to develop KM capabilities (Ávila-Robinson & Sengoku, 2017; Johnson, 2017), thereby fostering SE (Youssef et al., 2018). These findings address the role played by the organization's partnerships, networks, responsibilities, and operations in the development of SE (Wong & Aspinwall, 2004).

Our correlation analysis revealed a noteworthy relationship between the industry and the geographical location of SMEs concerning their establishment and business operations. This reveals that knowledge plays a pivotal role for small organizations, and effective KM processes can be achieved through OI. Internal sources such as management, partners, and employees can provide valuable knowledge that aids in executing the business's goals and objectives. On the other hand, external sources such as customers, suppliers, and information technology can contribute insights related to economic, environmental, and

social development (Qader et al., 2022). However, many SMEs in developing nations are operated by owners who may have limited, industry-specific knowledge. This often results in challenges for stakeholders to effectively share knowledge within the organization. Additionally, time constraints hinder the efficient exchange of knowledge, and limited financial resources impede the proper cataloging and storage of records. These constraints are exacerbated by a culture of informal communication and a belief in an infallible operating system (Aghimiena et al., 2019). This study further supports the significant potential of establishing a system for KM capabilities that encourages employees to invest their intellectual resources in providing solutions and contributing to the organization's goals and progress (Wong & Aspinwall, 2004). The objective of this study is to contribute valuable data and insights on how SMEs can benefit from establishing systems that integrate OI and KM, ultimately leading to SE. By implementing OI practices and adopting effective KM strategies, SMEs can overcome knowledge-related challenges and leverage both internal and external sources of information to drive their business forward. This study aims to highlight the importance of integrating OI and KM in SMEs and shed light on how these practices can contribute to SE. Through this research, we seek to provide practical guidance and recommendations for SMEs to establish robust systems that foster innovation, knowledge-sharing, and long-term success.

6.2 Implications

Many SMEs in developing countries, including Nigeria and Sub-Saharan Africa, face stiff competition in a rapidly changing global environment. To improve productivity, performance, and sustainability, these businesses are increasingly adopting KM activities. However, more research is needed to develop effective KM strategies that can be implemented across different organizational levels and in various businesses. The empirical findings of this study provide concrete evidence for SMEs on how to efficiently and effectively manage and integrate knowledge to enhance organizational performance and ensure SE in developing economies. The measurement instruments developed and validated in this study can serve as valuable tools for research on SMEs, KM, OI, SE, and other types of organizations, helping them to manage their most valuable resource, knowledge, effectively. This study provides empirical evidence that SMEs globally can benefit from developing KM capabilities to enhance SE. To survive in rapidly evolving and emerging markets, SMEs should gather knowledge and information from stakeholders such as employees, suppliers, customers, and information technology systems. Individuals have the opportunity to share, absorb, and utilize newfound knowledge to enhance the success of their organization. This leads to a deeper comprehension of economic, environmental, and social factors that are crucial for productivity, innovation, sustainability, and overall survival. Given the highly significant relationship observed between KM, OI, and SE, policymakers in the public sector should implement activities that foster KM, acknowledging its contribution to economic and global growth. Prioritizing the support and development of KM for OI is crucial for policymakers, unions, institutions, and businesses. This will not only enhance the capacity for SE but also provide necessary grants, business development services, technical assistance, and support to SMEs. By actively contributing to sustainable economic growth, SMEs will be motivated to continue their efforts with the aid of such support. To promote SE and effective KM, communities should prioritize innovative strategies like collaborations, peer groups, and partnerships across various sectors. It is also crucial to increase public awareness about the societal, economic, and global benefits of SE and KM. This study provides valuable insights into academic and management literature on applying KM to SE in SMEs. The study highlights a gap between KM and SE in SMEs and recommends exploring other variables that may impact the relationship between KM, OI, and SE in SMEs in future studies. This study explored the contextual factors that impact KM, OI, and SE in developing countries, particularly in Sub-Saharan Africa. Although an online descriptive methodology was used, it is recommended that future research utilize qualitative, longitudinal, and experimental approaches. This will help establish direct cause-and-effect relationships between variables and increase control over extraneous factors, thereby reducing uncertainties. Additionally, it is suggested that future research expand data collection beyond Nigeria by conducting comparative studies across different countries and continents, which will provide a more comprehensive understanding of the subject matter.

6.3 Limitations of Research

Regardless of the significant contributions of the research, this study has also encountered several limitations that must be taken into consideration in the process of interpreting the findings of this study. The study did not include contingency factors such as the state of organizational

structure, organizational culture, and political and economic influences. Including these other factors may provide interesting results on the influences of KM capabilities, OI, and SE. Also, the respondents of the survey, who were managers and supervisors in these SMEs, are expected to be the most knowledgeable members of the organization on the related variables of this study. However, in these organizations, no one individual truly has all the information requested in the study. For example, a manager of a service industry SME might not be able to provide adequate and effective answers for some external stakeholders. Therefore, using respondents at multiple levels of the organization could provide deeper knowledge and findings. Future research may look into collecting data from top, middle, low-level, and departmental experts as responders within the same organization.

The COVID-19 pandemic had an impact on the number of participants in this study. Future studies should consider data collection and testing after the pandemic to strengthen their findings. The COVID-19 pandemic has had a significant impact on various aspects of our lives, including health, education, social interactions, and the economy. Therefore, it is essential to examine how these changes have influenced different variables and to ensure that research findings accurately reflect the post-pandemic reality. Incorporating post-pandemic data collection and testing into future studies can enhance the validity and generalizability of research findings, provide a more comprehensive understanding of the pandemic's impact, and inform policy decisions as we navigate the post-pandemic world. Also, considering the influence of different industries on OI, KM, and SE is beneficial for future research. Each industry operates within its unique context, with specific challenges, opportunities, and dynamics that can shape the application and outcomes of OI, KM, and SE practices. By measuring these influences, researchers can gain insights into how these concepts are adopted, adapted, and utilized across diverse sectors. The following factors are why it is important to consider industry influences for SMEs in future studies; industry-specific challenges and needs, resource allocation and collaboration, regulatory and institutional frameworks, industry-specific outcomes, and impact and transferability of best practices across sectors. Incorporating industry influences into future studies on OI, KM, and SE enables a more nuanced understanding of how these concepts operate within specific contexts. It can inform industry-specific strategies, policy recommendations, and collaborative initiatives, ultimately advancing innovation, KM, and SE across diverse industries.

6.4 Recommendations

The significance of KM in OI for SE in SMEs is emphasized in this research. It is crucial for SMEs to effectively utilize their knowledge assets by developing robust KM capabilities. The study employs reliable tools to quantify KM as a concept, drawing on the KBV and dynamic capabilities theories. Furthermore, the findings of this study contribute to the existing literature on KM, SE, small business management, developing economies, and the attainment of the 2030 sustainability goals. It demonstrates that KM plays a mediating role between OI and SE in SMEs. Consequently, we can conclude that SMEs that prioritize OI and implement effective KM processes are well-positioned to drive innovation, enhance performance, and ensure SE within the competitive global market.

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Appendix A Variables and Measure Items

Variables	Sub-dimensions	Item
Organizational integration (internal)	Cross-functional teamwork	1. Our enterprise supports interdisciplinary group work for strategic planning
		2. Our enterprise supports interdisciplinary group work for decision making
		3. Our enterprise supports interdisciplinary group work for problem solving
		4. Our enterprise supports interdisciplinary group work for tools design and improvement process
	Employees participation	1. Our employees are encouraged to make suggestions to improve organizational processes
		2. Our employees have a space to share ideas and opinions
		3. Our employees' suggestions are routinely evaluated
		4. Our employees' suggestions are commonly implemented
	Rewards and objectives	1. Efforts toward improving organizational performance are rewarded
		2. Efforts toward higher performance are rewarded
		3. Our rewards system is aligned with the organizations' goals
Organizational integration (external)	Customer integration	1. Our enterprise pays attention to our customers' needs and studies how they use our products
		2. Our enterprise meets with and receives customer feedback on product performance (e.g., quality)
		3. Our enterprise endeavors to respond promptly to our customers' needs
		4. Our enterprise prioritizes finding means to satisfy our customers
	Supplier integration	1. Our enterprise involves suppliers in our strategic business planning
		2. Our enterprise involves suppliers in our product design and development
		3. Our enterprise involves suppliers in designing improvement programs (e.g., quality)
		4. Our enterprise involves suppliers in our project teams
	Information technology integration	1. Our enterprise relies on information technological systems in achieving inter-organizational activities and coordination
		2. Our enterprise utilizes information technology-enabled in processing transaction
		3. Our enterprise has direct ICT links with major suppliers
		4. Our enterprise has direct ICT links with major customer
KM processes	Knowledge acquisition	1. Our enterprise has activities for acquiring knowledge obtained from past mistakes
		2. Our enterprise has activities for acquiring new knowledge based on existing knowledge
		3. Our enterprise has processes for acquiring stakeholders' knowledge
		4. Our enterprise has processes for acquiring knowledge in developing new products

	Knowledge sharing	1. Our firm successfully shares key knowledge within the organization 2. Our enterprise has a knowledge-sharing culture 3. Our enterprise cross-trains individuals on key tasks and responsibilities 4. Our enterprise shares departmental knowledge through formal meetings
	Knowledge assimilation	1. Our enterprise has a process for organizing knowledge 2. Our enterprise has a process for filtering knowledge 3. Our enterprise has a process for analyzing knowledge 4. Our enterprise has a process for interpreting knowledge
	Knowledge application	1. Our enterprise has processes for applying knowledge to improve decision making 2. Our enterprise has processes for applying knowledge to adjust strategic direction for market competition 3. Our enterprise has processes for applying knowledge to providing solutions to old, existing, and new problems 4. Our enterprise takes advantage of applicable knowledge to address critical market needs 5. Our enterprise takes advantage of applicable knowledge to explore existing and upcoming opportunities
SE	Environmental aspects	1. We evaluate and, if necessary, adjust our operating routines for environmental purposes 2. We evaluate and, if necessary, adjust our production processing routine in environmentally friendly ways 3. We evaluate and, if necessary, adjust our delivery routine in environmentally friendly ways 4. We evaluate and, if necessary, adjust our products/service designs for environmentally friendly purposes
	Economic aspects	1. Our enterprise identifies opportunities for sustainable development 2. Our enterprise uses experience, activities, and values or various relevant stakeholders in addressing sustainability issues 3. Our enterprise applies norms, values, targets, and principles of sustainability to our practices 4. Our enterprise is willing to embrace new economic initiatives to make improvements in our practices based on norms, values, targets, and principles of sustainability
	Social aspects	1. Our enterprise identifies societal challenges and turns them into opportunities 2. Our enterprise brings together social, economic, and environmental conflicts of interest 3. Our enterprise is able to identify risks and opportunities that exist in the present and future development 4. Our enterprise is able to identify key operations that have a negative impact on society