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Article

Examining structural relationships between innovation capability, knowledge sharing, environmental turbulence, and organisational sustainability

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Examining structural relationships between innovation capability, knowledge sharing, environmental turbulence, and organisational sustainability

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ABSTRACT

Businesses that aim to efficiently and effectively combine strategy, governance, and resource allocation face new impediments as the global economy becomes more turbulent. As the environment becomes more demanding and people seek new business opportunities, knowledge sharing helps organizations succeed in the long run. The purpose of this study is to assess the direct structural relationship between variables as well as the moderating influence of environmental turbulence on Nigerian SMEs. This study collected firm-level data from Nigerian manufacturing SMEs via questionnaires, with a sample size of 402. Furthermore, partial least squares structural equation modelling (PLS-SEM) using the SmartPLS software was used to conduct additional analyses. The findings demonstrated a strong correlation between an organization's long-term health and its ability to share knowledge and generate new ideas. They also showed that environmental turbulence affects the connection between the factors that were studied, and this is consistent with previous studies. By considering the presented heuristic model, this study offers valuable insights for managers, researchers, and policymakers to enhance organizational efficiency and sustainability. It adds to the literature on sharing knowledge and innovation in manufacturing SMEs in a turbulence environment.

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value creation

SUBJECTS

Business, Management
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Environmental Economics;
Sustainable Development

1. Introduction

Management strategies and tools for small and medium-sized enterprises (SMEs) must evolve in response to accelerating environmental change, crises, growing uncertainty, and rising economic, environmental, social, and political risks (Dziekański et al., 2021; Pimenowa et al., 2023). The dominant ideas of the old management paradigm, which prioritized profit and productivity above all else, no longer apply to the modern business world. For a company's long-term survival and competitive agility, it is crucial to innovate and share knowledge gained from one's internal and external surroundings. Innovation drives the knowledge economy, which relies on intangible assets for long-term business growth and survival (Li et al., 2019).

Researchers in the field of organizational science have proposed a wide variety of strategies for improving companies' overall effectiveness in the face of uncertainty and change. Hence, benefits are fleeting in circumstances where anything might happen. Companies can stay afloat in these turbulent environments if they can adjust to them on demand (Klenam et al., 2024). Enterprises in today's highly competitive markets are always on the lookout for fresh ideas and are actively involved in knowledge sharing. Conscious of the lesser benefit and higher failure rate, they observe the competition eager to mimic ideas and introduce innovations without completely testing, optimizing, and planning. Company owners that are the first to market a product or service rarely get to keep the advantage for very long.

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The constant abandonment of core products and reliable business procedures is a necessary evil for any company that wants to survive in today's unpredictable marketplace. Hence, organizations need to be innovative and knowledgeable to survive in today's turbulent environment.

Researchers are getting more and more interested in how innovations are created, and being spread, connoting how germane innovation is for modern businesses (Becheikh et al., 2006). At some point or another, businesses in every field have to adapt to conditions that are very hard to predict. Leaders require assistance in navigating challenging situations so that their companies can thrive. According to studies of environmental turbulence, businesses operating in highly fluid and uncertain settings benefit from a decentralized, more organic organizational structure. However, further research is required to validate and expand upon these findings, as empirical research has already demonstrated a connection between knowledge sharing, sustainability, and innovation capability separately (Esterhuizen et al., 2012; Hartono & Sheng, 2016; Jilani et al., 2020; Lin, 2007). To begin with, studies have shown conflicting results when attempting to establish a link between environmental turbulence and organizational sustainability. Some explanations for this uncertainty include the fact that there are a variety of elements outside environmental turbulence (ET) and sustainability that influence the link between the two. Both external and internal uncertainties might occur as a company works to bring its resources into harmony with its external surroundings.

Researchers like Singh and Gaur (2009) have pointed out, however, that results in one setting may not be transferable to another, especially if the cultures, types of organizations, and environments are different. Because of discrepancies in the existing literature, the investigation additionally explored a supplementary variable, integrating environmental rivalry, to confirm the connection between innovativeness, knowledge sharing, and sustainability. Because there isn't a lot of real-world research on these ideas, this study aims to find and describe the structure-based connection between innovation capability, knowledge sharing, and organizational sustainability in small businesses within a developing nation like Nigeria.

Furthermore, knowledge sharing, innovation capability, and organisational sustainability are all factors that can affect how well an organization survives environmental turbulence. This study intends to help close that knowledge gap by investigating how turbulence influences these relationships. Along with the overarching goal, this study aims to address the research question: 'To what extent does knowledge sharing and innovational capability anchor SMEs sustainability via an indirect mechanism of environmental turbulence?' Therefore, there is a notable gap in understanding how knowledge sharing and innovation interact, particularly in the context of the manufacturing SMEs industry, despite the available literature recognizing the importance of both knowledge sharing and innovation in turbulent era, with resultant to sustainability (Camelo et al., 2011; Castaneda & Cuellar, 2020; Kremer et al., 2019; Podrug et al., 2017). As a result, there is a pressing need to design new sustainability systems that prioritize SMEs' environmental influence, knowledge, and innovation capacity, all of which prove beneficial for the economy and SMEs in particular. We anticipate its theoretical and practical contributions to both the innovation framework and the strategic perspective.

2. Literature review and hypothesis development

2.1. Theoretical background

In order to understand the connection between knowledge sharing, innovation, environmental turbulence, and organisational sustainability, various theories have been proposed in the existing literature. The research here, however, relies on two theories: contingency and resource-based view theory.

The Resource-Based View Theory (RBV) assumes that maintaining and enhancing an organization's performance requires careful consideration of that entity's existing resources and skills. A company's resources might be either material (such as equipment) or immaterial (such as its knowledge base) in nature (Mills et al., 2003). One of the theories employed in the field of management is the resource base view (Almarri & Gardiner, 2014). The resource base theory is based on the work of Barney and says that a company needs both tangible and intangible resources to improve its performance and gain a competitive edge.

According to proponents of contingency theory, an organization's internal resources and plans need to be compatible with elements of the external environment over which it has no control. The core idea

of the contingency approach is that a combination of the firm's structure, processes, and external environment determines its performance. As a result of situations like these, businesses adopt specific perspectives so as to complement and enhance the environments in which they operate. The idea behind adopting contingency theory is that in order for a business to succeed in the marketplace, it needs to pay close attention to the offerings of competitors, the needs of customers, and the state of the external environment, over which it has no say. Research has found that paying attention to the external environment and adapting plans accordingly leads to organizational success and enhanced performance (Rauch et al., 2009; Yeoh & Jeong, 1995). Therefore, this study uses contingency theory based on the work of Rauch et al. (2009) and Yeoh and Jeong (1995), who showed how important it is to understand how a company's exposure to an unstable external environment affects the structure, strategy, and context of an organization.

2.2. The effect of knowledge sharing and organizational sustainability

Knowledge management (KM) activities impact corporate culture, structure, strategy, and efficiency in general through knowledge production, sharing, and application. In general, people are happy to share what they know since doing so is in line with their inherent nature and the human need to learn. Nevertheless, sharing of information behaviour among its personnel is inhibited, and deterrents can have an undulating effect if there are obstacles, such as losing control of personal resource disposition or the face value lost as a result of sharing knowledge (Jokanović et al., 2020).

Meanwhile, Akadiri and Fadiya (2013) define organizational sustainability as "business-related elements, features, or aspects that could affect or be affected by how a firm function." It is believed that a company's ability to cultivate a culture that values and rewards innovative problem-solving and collaboration is crucial to its long-term viability (Ljungholm, 2016; Olaleye et al., 2023). Academics and business leaders have paid more attention to the idea of organizational sustainability over the past 20 years (Aninkan & Oyewole, 2014; Eccles et al., 2014). This is because organizational sustainability is important for long-term success and can improve short-term performance (for example, by increasing profits and improving employees' attitudes or behaviours at work, like being more engaged at work, sharing knowledge, and being more creative at work).

Knowledge sharing occurs when one worker imparts their expertise to another (Ryu et al., 2003). According to Cummings (2003), one of the greatest opportunities for a company to gain access to existing information and generate new information is through the sharing of knowledge. According to Hendriks (1999), when two parties exchange information, one party externalizes their knowledge while the other party internalizes it. According to Cummings (2003), businesses experience an increase in innovation and productivity when employees share their expertise.

Sustainable firms can boost their efficiency in three distinct areas at once: financial, ecological, and societal (or human) (Hart & Milstein, 2003; Spreitzer et al., 2012). Financial success and quality output are indicators of economic performance; environmental sustainability and protection against resource depletion and environmental harm are hallmarks of environmental performance; and employee satisfaction is indicative of social performance (Florea et al., 2013). This is why businesses need a complete, long-term plan that takes into account the environmental, financial, and social (i.e., human) aspects of growth if they want to achieve and maintain sustainable growth.

H1: knowledge sharing has a significant and positive influence on organizational sustainability.

2.3. Effect of innovation capability and organizational sustainability

Many studies on organizational innovation were motivated by managers' real-world worries and needs. As a result, most of the theories put forward have been normative and have offered recommendations for how businesses might increase their innovation capacity. According to Zawislak et al. (2012), a firm's ability to innovate relies on the people, systems, and processes it employs to transform existing bodies of knowledge into marketable products and services. He further defined innovation capacity as a company's capacity to take in new technology, modify it as needed, and implement it into its management,

operations, and transactions in a way that generates a profit in the Schumpeter model. Zheng et al. (2010) define innovation capability as the capacity to generate new and valuable information or goods. The capacity to continually convert information and concepts into novel goods, procedures, and systems for the benefit of the company and its constituents is defined by Lawson and Samson (2001) as innovation capability. Therefore, small businesses that want to compete with their larger and more resourceful rivals must have the competence to innovate.

Product innovations are the primary factors that determine sustainable development, according to Al. Othman and Sohaib (2016), who studied innovation capabilities and business sustainability in Saudi Arabia. In addition, according to Sipos (2008), companies can increase and maintain their competitiveness by introducing new products that use cutting-edge technologies and modern production techniques. One of the most important strategic assets for a company to maintain its competitive edge is its innovation capability (Ponta et al., 2020). However, Gunday et al. (2011) showed that there are many ways in which businesses can improve their innovative capacities. These include product, process, structural, and service innovation. Meanwhile, in a turbulent environment, a corporation must be innovative, hence, innovative performance requires innovative capabilities.

Based on the research on innovation capacities and company sustainability in Saudi Arabia, Al. Othman and Sohaib (2016) concluded that innovation (product) is the most important component in determining sustainable development. Furthermore, organisations can enhance and sustain their competitiveness by launching new products that incorporate state-of-the-art technologies and contemporary production methods, as stated by Sipos (2008). According to multiple study frameworks, the likelihood of building a sustainable organization increases when creative capabilities are merged. At the same time, a mountain of evidence shows that an organization's capacity for innovation is directly proportional to its success in the long run. The chances of successfully constructing a sustainable firm increase when innovative capabilities are combined, as shown in several research framework. Meanwhile, a large body of research indicates that innovation capabilities considerably improve a company's long-term viability.

H2: innovation capability has a significant and positive relationship with organizational sustainability.

2.4. Nexus between knowledge sharing, innovation capability, and organizational sustainability

Firms value knowledge sharing as a valuable resource for innovation due to its particular, socially complex, and path-dependent qualities. According to Aulawi et al. (2009), knowledge sharing can be diffused, implemented, and developed. They also said that knowledge sharing encourages critical and creative thinking, allowing people to create new knowledge. Companies can benefit from this knowledge. Lin (2007) has stated that knowledge collection and donation affect corporate innovation. Lin (2007) found that knowledge sharing boosts innovation. Knowledge-sharing organizations may be more innovative.

Egbetokun et al. (2007) proposed several elements that could increase the capacity for innovation. Egbetokun et al. (2007) proposed many elements that could increase an organization's capacity for innovation. Leadership, cultural adaptability, change, learning, social interaction, and making personal connections are all important parts of this equation. First, the entrepreneurs and staff bring their expertise and abilities from previous experience to the organization. Yang et al. (2008) claimed that tacit, dynamic, irreducible, and extensible knowledge allows organizations to innovate on operations, services, and products and block competitors. Knowledge management can provide strategic benefits such as increasing productivity and efficiency, reducing costs, strengthening customer relationships, improving decision-making, fostering innovation, enhancing corporate agility, accelerating product line development, and boosting employee learning, satisfaction, and retention.

Many studies have found that when employees share their knowledge, businesses see higher rates of innovation and overall performance (Cummings, 2003; Lin, 2007; Yang et al., 2008; Zhi-hong et al., 2008). Lin (2007) argues that knowledge sharing inside companies can positively affect innovation capacities, which in turn can positively affect innovation performance. Since Qammach (2016) argues that knowledge sharing can improve innovation performance, it is essential that firms give this practice a high priority.

The sharing of knowledge is one element that promotes innovation (Castaneda & Cuellar, 2020). Without the exchange of knowledge, new ideas are highly unlikely to emerge (Kremer et al., 2019). When people work together to gain knowledge and skills, innovation is more likely to be successful (Adams et al., 1998). When discussing innovation, "knowledge sharing" refers to the practice of exchanging specialised information with the goal of making new and better goods and services. A key component of product development competence is the ability to share knowledge (Hoopes & Postrel, 1999). Knowledge sharing had a favourable effect on innovation in organisations, according to a survey of Spanish enterprises conducted by Camelo et al. (2011). Knowledge sharing enhances innovation capability in Croatian enterprises, as shown by Podrug et al. (2017). Informal sharing of knowledge was determined to be the most effective means of fostering innovation by Taminiau et al. (2009). Knowledge exchange and innovation are linked, as Mura et al. (2013) elucidated.

Keeping abreast of market trends and changes is critical for success in the small and medium-scale sector because of the intense competition and frequent change in the industry. In the face of crises that shake up established business models, the ability to quickly adjust depends on knowledge as well as innovation. The ability to adapt is crucial for organisations to survive and grow in the ever-changing small company environment. To be more precise, small and medium-sized manufacturing businesses (SMEs) are forced to reevaluate their plans for survival and growth in the face of unprecedented turbulence and skepticism. Thus, innovation is a means by which knowledge is transformed into organisational outcomes during an economic downturn, primarily with regard to the organization's continued survival. In times of crisis, hotels that are innovative and actively share what they know will have a better chance of not only surviving but thriving, which will have a positive impact on their entire performance and survival. Numerous studies have demonstrated that encouraging employees to share their knowledge and insights with one another might help an organization be more innovative and retain less of its knowledge for itself (Heffner & Sharif, 2008; Lundvall et al., 2007). Researchers have derived these assumptions from the aforementioned premise. The third hypothesis is:

H3: knowledge sharing has a significant and positive influence on the innovation capability of SMEs.

2.5. Moderating role of environmental turbulence

Environmental turbulence (ENVT) was defined in this study as the rate of change in technological capabilities, consumer preferences, and the intensity of market rivalry. ENVT is the rate at which a company's technology, consumer demand, and level of market rivalry in its sector are all changing (Duncan, 1972). According to research by Hitt et al. (1998), Environmental turbulence (ENVT) has made knowledge in a company's business process more intense, and knowledge's importance and attention have grown with time. Jansen et al. (2005) discovered that, when faced with a tumultuous and fast-changing environment, businesses boost the development of new products by encouraging the understanding, integration, and application of knowledge within a new cognitive framework.

The level of unpredictability and volatility in a market's product offerings, technological developments, and customer demand is known as environmental turbulence. Extremely fluctuating and unpredictable conditions, such as sudden shifts in demand and growth rates (Dess & Davis, 1984), fleeting competitive advantages, and low barriers to entry and exit (Chakravarthy, 1997), all contribute to a climate of uncertainty and unpredictability. Manufacturing companies (SMEs inclusive) in most developing nations have had to find creative solutions to their financial woes as a result of economic uncertainty and intense industry competition.

When there is rapid change and little stability in an organization's external environment, we say that it is turbulent (Dess & Beard, 1984). As the world around us evolves, businesses and their competitors face both new opportunities and challenges. Because of this, businesses often need to act quickly to maintain a competitive edge. There is a dearth of literature examining the impact of environmental turbulence on the market-oriented activities and performance of microfinance institutions. For instance, it will be important to adapt promptly when clients need changes or when competitors rapidly alter the products they offer. Due to the uncertainty in the environment, businesses need to be vigilant and flexible enough to swiftly adjust to new circumstances. In other words, organizations can leverage disruptions in the external environment to their advantage. On the basis of the foregoing investigation, this study made the following hypotheses:

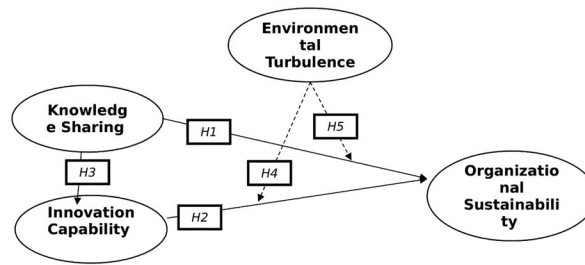


Figure 1. Research model.

Source: Author's design.

H4: Environmental Turbulence (ENVT) moderate the relationship between innovation capability and organizational sustainability of manufacturing SMEs in Nigeria

H5: Environmental Turbulence (ENVT) moderates the relationship between knowledge sharing and sustainability of manufacturing SMEs in Nigeria

The study's framework and hypothesis are derived from RBV and contingency theory, as shown in Figure 1.

3. Methodology

3.1. Sampling and data collection

Developing nations, in particular, rely heavily on their small and medium-sized businesses (SMEs) to fuel their economic growth and development (Aribaba et al., 2019; Papadopoulos et al., 2020). A large number of jobs and long-term economic sustainability are created by small and medium-sized enterprises (SMEs), which make up a significant portion of firms worldwide (World Bank, 2021). Lagos State Metropolis, as the most industrialized centre and state with the largest number of manufacturing SMEs in the country, is the focus of this research. The researcher adopted a hybrid approach, using both convenience sampling and purposive sampling. With this approach, the researcher can set criteria for the necessary sample units because the participant type is already known.

The authors reached out to the managers of the manufacturing SMEs individually, explaining the significance of the study and requesting their responses. We conducted a pilot study using 10 questionnaires before the final distribution to ensure the questions were thorough and easy to understand. There was no requirement to modify the questionnaire following the distribution and collection of the pilot test. We gathered data from June 2023 to October 2023. A cover letter assured the confidentiality of the responses to all the business owners and managers. We took this action to combat common method bias (Podsakoff et al., 2003).

The researchers selected a random sample of small-scale business owners to receive the surveys. The population of small and medium-sized enterprises (SMEs) in the state is five hundred and fifty-five (555) SMEs chosen across each of the state's local government areas. Using G*Power version 3.1.9.2 with an effect size of 0.15, a significance level of 0.05, and a statistical power of 0.95, the researcher finds that 385 is the optimal sample size for this study. So, the researcher sent as many questionnaires as feasible, including the online survey method, in order to reach the desired sample size. Hence, a total of 555 questionnaires were distributed to the managers of some SMEs, involving employees knowledgeable on the subject matter to increase the validity of the responses. The final number of retrieved and analyzed questionnaires was 402, yielding a response rate of 72.4%.

3.2. Measures

The instruments undergo further validation after having their dimensions, which measure the corresponding latent variables, adjusted and taken from previous research. The validity of the instrument was checked through multiple means, including discussions with experts, and no issues with measurement were found. Along with subject-matter specialists, 15 surveys were sent out as a pilot study to check for

clarity; no problems with clarity were found. The standard recommendation for a pilot study is thirty participants, but because the modified instrument had previously been validated, the researchers felt that fifteen participants would be sufficient. Even a pilot sample size of ten may be enough, say Hertzog (2008) and Nieswiadomy (2002). The internal consistency of the instrument was assessed by applying Cronbach's alpha test to both IBM SPSS and SmartPLS.

Previous studies (Robledo et al., 2010; Olaleye et al., 2020, 2021) utilized a well-structured survey to gather information relating to the measurement of innovation capability using a five-item scale. Meanwhile, Jansen et al. (2005) and Bodlaj and Čater (2019) made an environmental turbulence scale, which was based on the work of Jaworski and Kohli (1993), Wilden and Gudergan (2015), and Abbas and Ul Hassan (2017). Bock et al. (2005) devised a five-item, five-point Likert scale to evaluate knowledge sharing. This tool can measure two sorts of knowledge-sharing intentions: explicit and tacit. This scale includes statements like "I am good at sharing what I know with other people in my organization." Finally, a nine-item scale for measuring organizational sustainability was developed and implemented based on the study conducted by Balasubramanian and Balaji (2022) and Olaleye et al. (2023).

3.3. Ethical consideration

To ensure research ethics, the identities of respondents remained anonymous, and all data sources were acknowledged in the study while written consent was sought. The survey used in obtaining data went through the Faculty of Management Sciences Ethical Committee with reference number (FUOYE/FMS-REC/SS0636/08).

3.4. Data analytical technique

The study used descriptive statistics to ensure basic assumptions and describe the data to be obtained, as well as SmartPLS version 3, developed by Ringle et al. (2020), to conduct partial least square structural equation modelling (PLS-SEM) to analyse the data. Ali et al. (2018) report that various fields of social science, including business management research, now widely use PLS-SEM. Because it permits the assessment of intricate models without imposing distributional assumptions on the data, the PLS-SEM method has attracted the attention of many academics. Such models often contain several constructs, structural routes, and indicator variables. Crucially, though, PLS-SEM is thought of as a causal-predictive approach to SEM, which emphasises the prediction aspect of assessing statistical models and how they are structured to provide causal explanations (Sarstedt et al., 2017; Wold, 1982). Reinartz et al. (2009), Henseler et al. (2014), and Hair et al. (2016) suggest that PLS-SEM can address problems with creating undesirable outputs or failing to converge with small samples and complex models when using methods like CB-SEM. Finally, this study analyzed the model fit using metrics such as the "standardized root means square residual" (SRMR), the "normal fit index," and others to determine how well the research model matches the data.

4. Results

4.1. Descriptive analysis

Table 1 represents the demographic information of the respondents, including gender, age, and educational level. The result shows the majority of respondents were male (56%), while female respondents accounted for 44% out of the 402 participants. The least of the respondents (10.7%) were above the age of 50 years, while the majority (56.7%) were within the age bracket of 30–39 years. 27.9% had university education, and 116 (33.8%) had at least attended high school, while the majority possessed an NCE or diploma certificate.

4.2. Assessing measurement model

Using a two-stage PLS model developed by Anderson and Gerbing (1988), both structural and measurement models were under analyzed. One way to ensure that the measurement model was valid was to examine the factor loadings, composite reliability (CR), and average variance extracted (AVE).

The researcher evaluated internal consistency measures using Cronbach's alpha (CA) values. As shown in Table 2, Cronbach's alpha values range from 0.779 to 0.882, which are more significant than 0.70 as recommended by Nunnally (1978). There are also excellent item loadings, as these range from 0.644 to 0.903. Discriminant and convergent validities are determined through the values of average variance extracted (AVE) and composite reliability (CR). The values higher than 0.50 for AVE and higher than 0.70 for CR confirm convergent validity (Fornell & Larcker, 1981; Bagozzi & Yi, 1988; Olaleye et al., 2021; Vetbuje & Olaleye, 2022). If the values for the square root of AVE are greater than the constructs' correlation values, then discriminant validity is achieved (Anderson & Gerbing, 1988).

Furthermore, the "heterotrait-monotrait" (HTMT) correlation ratio became the de facto standard in the "Fornell and Larcker approach" (Henseler et al., 2015) when it was offered as an alternative to the Fornell-Larcker (1981) criterion. Kline (2005) says that the model constructs had a high level of discriminant validity when their HTMT values were directly above the square roots of the AVEs and dropped below the 0.9 threshold (see Table 3). In addition, according to the rule of thumb established by Hair

Table 1. The demographic profile of respondents.

Variables	Categories	Freq (n = 402)	Percentage
Gender	Male	225	56.0
	Female	177	44.0
Age	Below 30 years	64	15.9
	30–39 years	228	56.7
	40–49 years	67	16.7
	50 years & Above	43	10.7
	Secondary School	136	33.8
Highest Educational Level	NCE /Diploma	154	38.3
	University level	112	27.9

Source: author's work.

Table 2. Measurement model.

Latent Variables	Loadings(λ)	CA	rho_A	CR	AVE
Innovation Capability	CI	0.845	0.846	0.890	0.617
CI1	0.754***				
CI2	0.749***				
CI3	0.809***				
CI4	0.816***				
CI5	0.798***				
Knowledge sharing	KS	0.871	0.873	0.912	0.721
KS1	0.837***				
KS2	0.853***				
KS3	0.856***				
KS4	0.849***				
KS5	–				
Environmental Turbulence	ENVT	0.837	0.840	0.881	0.552
<i>Market Turbulence</i>	MT	0.851	0.851	0.910	0.771
MT1	0.867***				
MT2	0.903***				
MT3	0.863***				
MT4	–				
<i>Technological Turbulence</i>	TT	0.785	0.786	0.875	0.700
TT1	0.803***				
TT2	0.868***				
TT3	0.837***				
TT4	–				
Organizational Sustainability	OS	0.880	0.881	0.904	0.511
<i>Employee-Related Sustainability</i>	ERS	0.779	0.788	0.850	0.532
ERS1	0.658***				
ERS2	0.678***				
ERS3	0.831***				
ERS4	0.771***				
ERS5	0.697***				
<i>Governance Sustainability</i>	GS	0.811	0.820	0.878	0.647
GS1	0.836***				
GS2	0.884***				
GS3	0.828***				
GS4	0.644***				

Source: Author's computation, 2023. – deleted due to poor loadings.

et al. (2017), the variance inflation factor (VIF) for both independent variable is smaller than 3. According to Table 4, this means that the model does not have a multicollinearity problem.

4.3. Test of hypotheses

In order to verify our predicted connections, we used "partial least squares structural equation modeling" (PLS-SEM). Table 5 and Figures 2 and 3 list the parameters of the underlying structures of the proposed relationships.

Table 5 displays the direct effects. The results reveal that there is a significant and negative impact of knowledge sharing on organizational sustainability ($\beta = -0.206$, $P < .001$). Thus, the first hypothesis, H1, is supported. Moreover, the results also demonstrate a significant impact of innovation capability on organizational sustainability ($\beta = 0.301$, $P < .001$). Hence, H2 was accepted. Furthermore, results reveal a significant impact of knowledge sharing on innovation capability ($\beta = 0.618$, $P < .001$). Thus, we accept H3.

Table 5 presents the results of how environmental turbulence moderates the indirect effect on organizational sustainability through innovation capability and knowledge sharing. The indirect effect of innovation capability on organizational sustainability through the moderation of environmental turbulence is significant ($\beta = 0.202$, $P < .001$). Moreover, the moderation effect of ENVT on the relationship between knowledge sharing and organizational sustainability is also significant with a positive coefficient ($\beta = 0.170$, $P < .001$). The results of the analysis strongly confirm the expected moderation connections in H4 and H5, therefore accepting them, and ambient turbulence has a significant moderating influence.

Moreover, the estimation of determinant coefficients (R^2) reveals that KS and IC can explain 44.1 percent of the variation in organizational sustainability, while the variables could only account for a low degree of predictability, as indicated by the value of R^2 between path KS being 38.1 percent. Sullivan and Feinn (2012) argued for the inclusion of substantive significance (F^2) in addition to beta coefficients, statistical significance, and variance explained (R^2). Table 5 shows the magnitude of the effects of the direct pathways. Cohen (1988) reports that the f^2 values for the path (KS \rightarrow IC) were above the 0.35

Table 3. Discriminant validity (Fornell-Larcker criterion and HTMT ratio).

Variables	ENVT	IC	KS	OS
Environmental Turbulence (ENVT)	^a 0.743	^b 0.849	0.770	0.097
Innovation Capability (IC)	0.716	0.786	0.714	0.108
Knowledge Sharing (KS)	0.660	0.618	0.849	0.086
Organizational Sustainability (OS)	0.020	0.053	0.045	0.720

Source: author's computation.

Notes: ^a= Diagonal values in bold are the square root of AVE".

^b= HTMT ratio are values italicized and placed above the diagonal values in bold format".

Table 4. Collinearity diagnostics.

Variables	ENVT	IC	KS	OS
Environmental Turbulence (ENVT)	–	–	–	2.750
Innovation Capability (IC)	–	–	–	2.756
Knowledge Sharing (KS)	–	1.000	–	2.505
Organizational Sustainability (OS)	–	–	–	–

Source: author's computation.

Table 5. Path analysis result.

Model fit summary		SRMR = 0.072		NFI = 0.847		Chi-Square = 1,218, 016	
Relationship	Beta	Std. Error	T-value	p-value	F ²	R ²	Decision
H1: KS \rightarrow OS	0.206	0.002	2.342***	0.072	0.176	0.558	Supported
H2: IC \rightarrow OS	0.301	0.027	2.440***	0.001	0.286	0.558	Supported
H3: KS \rightarrow IC	0.618	0.048	12.941***	0.000	0.617	0.381	Supported
Indirect Effects (Moderation)							
H4: ENVT_MOD*IC \rightarrow OS		0.202	0.042	2.297***		0.000	Supported
H5: ENVT_MOD*KS \rightarrow OS		0.170	0.018	2.524***		0.004	Supported

Source: author's computation.

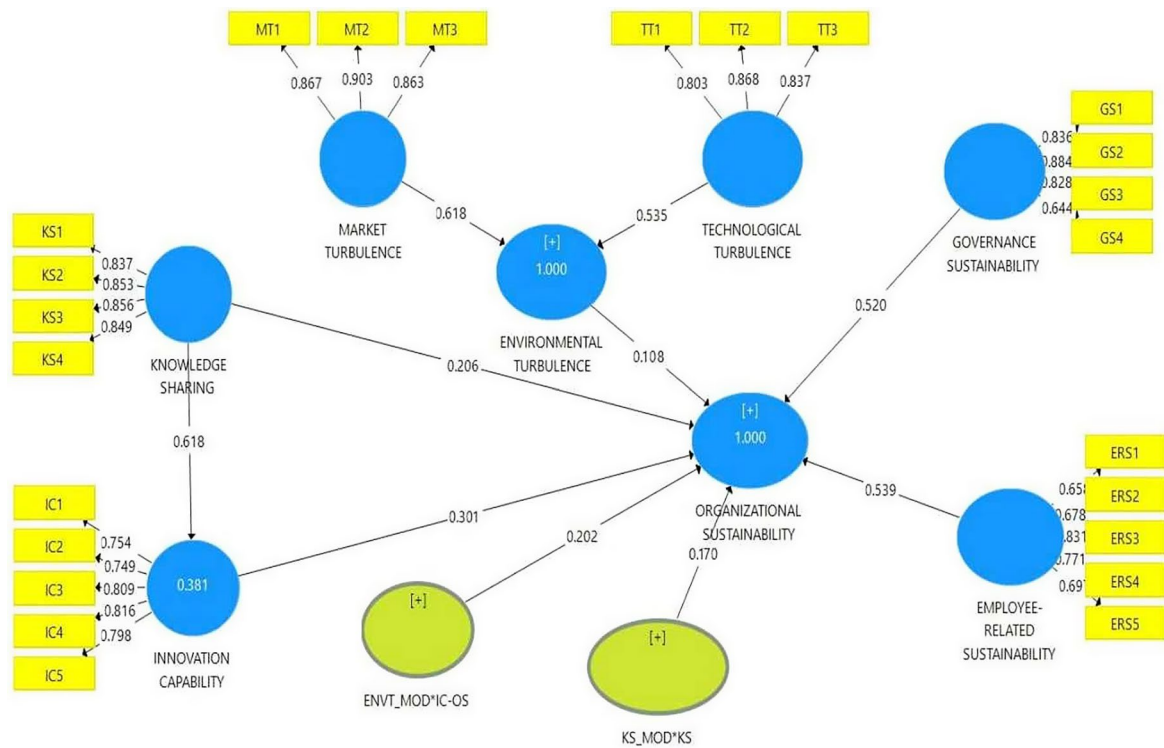


Figure 2. A path analysis.
Source: Results of analysis by author.

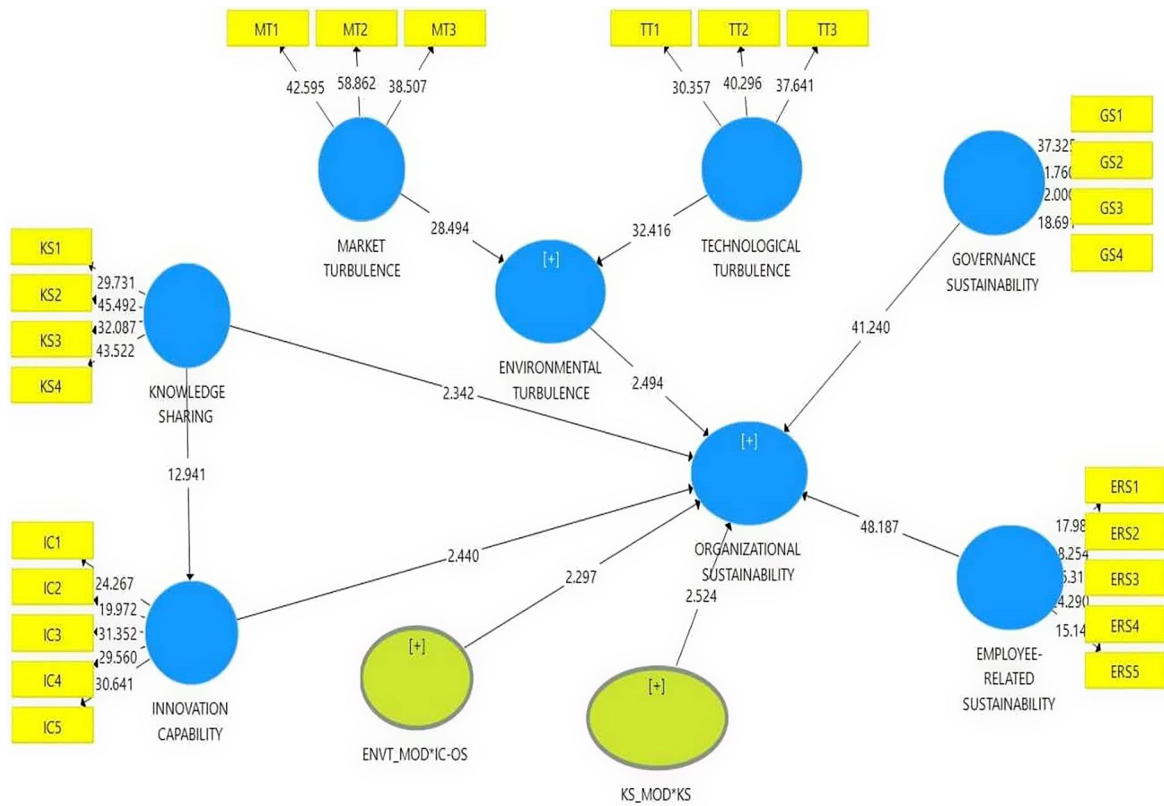


Figure 3. t-statistic.
Source: Results of analysis by author.

threshold, indicating that this path had large effects. Furthermore, the f^2 values for the paths (KS→OS) and (IC→OS) have a moderate effect threshold (< 0.35), showing that organizational sustainability moderately supported the significant influence of knowledge sharing and innovation capability, while the moderating paths (ENVT_MOD*IC and ENVT_MOD*KS) have a low effect since the f^2 values were between the thresholds of 0.02 and 0.15.

5. Discussion

Knowledge sharing, innovation capability, and organisational effectiveness are examined in this study, with a focus on how environmental turbulence moderates this link. As predicted by the first hypothesis, the study finds strong evidence of a link between knowledge sharing and sustainability. The findings are in line with those of Abbas et al. (2019) and Aamir et al. (2021), who both highlighted the importance of sharing knowledge in determining the sustainability of organisations. One definition of knowledge management is "the fundamental effort of management to use tools and approaches to find, improve, transfer, and apply knowledge and experience that is available in the organisation" (Kavalić et al., 2021). A positive relationship between the two factors is implied by the null hypothesis (H1). One way to ensure a company's long-term viability is to foster a culture of optimal information transfer.

In Nigeria, the economy relies heavily on SMEs, which are the most vital gears in its economic machine. Niyi Anifowose et al. (2022), Olaleye et al. (2021), Ugheoke (2021), and Zhen et al. (2021) are just a few of the researchers who have led research into the dynamics of SMEs, particularly in the manufacturing sector. Knowledge sharing (KS) has a detrimental effect on sustainable performance, according to research by Jilani et al. (2020). Recognising the operational complexity of manufacturing SMEs is crucial, as it sets them apart from their service-providing counterparts. These operational intricacies amplify the hurdles manufacturing SMEs encounter in their journey towards survival and growth.

Afterwards, the researchers meticulously constructed the second research proposition (H2) to examine the relationship between innovation capability and organizational sustainability. These findings emphasize that innovation capabilities are essential for driving sustainable organizational reforms in the face of uncertain business climates (Dwivedi et al., 2023; Islam et al., 2018; van de Wetering et al., 2017). In light of extant literature, it is clear that numerous organizations are under intense pressure to enhance customer efficiency and effectiveness, adopt more eco-friendly work practices, make use of green technologies, and foster innovation throughout the organization by enhancing collaboration (Carayannis et al., 2015; Olaleye, 2023; van de Wetering et al., 2017).

As a key factor in surviving in a competitive and turbulent environment, modern organizations across various industries are currently investigating new innovative digital technologies to address a multitude of challenges (El Sawy et al., 2010; Sambamurthy et al., 2003). Additionally, the RBV corroborates our findings regarding the positive correlation between innovation capability and sustainability.

Thirdly, the researcher formulated hypothesis three (H3) to look into how KS affects innovation capacity directly. Findings corroborated the favourable effect of KS on innovation, lending credence to the findings of Lopes et al. (2017). These results support what Olaleye et al. (2021, 2020) said about how a good mix of high knowledge management skills and sharing can affect the long-term ability to be innovative. They found that strong sharing of knowledge leads to effective innovation capacity.

The researcher applied moderation analysis as a criterion to examine the strength of the association between two variables. The researcher hypothesized that environmental turbulence could serve as a moderator between the magnitude of the interactions among knowledge sharing, innovation capability, and organizational sustainability. The more turbulent the environment, the more innovation is needed to protect organisations from archaic products and technologies and to capitalize on emerging technology to build new forms of business that can sustain and improve company performance (Arifiani et al., 2021; Clauss et al., 2019; Rivera-Rodríguez et al., 2017). Furthermore, the results of the confirmed empirical study by Taghizadeh et al. (2023) indicate that exposure to the current state of innovation and the development of a strong knowledge management culture are two key components for achieving consistently better sustainable performance, even in a turbulent environment.

One possible outcome of this kind of integrated strategy is a novel model of knowledge sharing, which has the ability to generate new forms of competitive advantage and boost long-term performance

(Bashir et al., 2023; Ko & Tan, 2012). Even in the face of environmental uncertainty, this research argues that innovation and systems for sharing knowledge can serve as "enablers" to transmit information that improves sustainability.

The results demonstrated that within Nigerian manufacturing SMEs, markets with high levels of technological and market turbulence, which are components of environmental turbulence, the correlation between these variables is generally larger. Organizations also exhibit better sustenance and innovation when competition is fierce, according to similar research. In conclusion, this study reveals the intricate relationship between environmental turbulence and its moderating effect on the link between knowledge sharing, innovation capability, and organizational sustainability.

6. Implication of the study

The study investigates how knowledge sharing, innovation capability, and the moderating role of environmental turbulence contribute to a firm's desire for sustainability, particularly in SMEs where it is scarce. In order to stay afloat in the face of ever-present competition and generate more wealth despite operating in a turbulent environment, this research is anticipated to provide fresh opportunities for model and strategy development. From a managerial vantage point, this study fills in the gaps in understanding between internal and external knowledge sharing, offering a holistic view of improving innovative business model strategy. This study aims to empower small and medium-sized manufacturing companies to leverage the potential of environmental turbulence, bolstering their digital transformation capabilities for ongoing survival and competitiveness. Furthermore, knowledge sharing as a concept in knowledge management relies on exchanging information and understanding, both internally and with outside parties, because it facilitates the sharing of information and skills amongst employees, which in turn can increase the depth and breadth of an organization's body of knowledge. Consequently, this paves the way for an organisational learning culture among practitioners, which in turn can aid in establishing an innovation and continuous improvement culture.

The findings of this study provide credence to the idea that methods centered on the aforementioned three concepts can lead to long-term viability. Since your company's most valuable asset is the sum of its employees' individual knowledge, it is recommended that practitioners undergo training on targeted innovations and participate in team-building exercises that emphasize the importance of sharing organizational knowledge with other members of the firm. So, these strategies aim to improve sustainability among SMEs in the research area by addressing the three most common characteristics.

In many organizational contexts, prior research has examined how environmental turbulence affects various variables and interactions. How has environmental turbulence affected the connection between sharing knowledge, innovation, and sustainability? This is the question this study sets out to answer. While this study's findings are consistent with those of earlier studies, no one has ever examined the efficacy of knowledge sharing or its connection to innovation and sustainability in the face of environmental turbulence, particularly in Nigeria's most promising economic sector—small and medium-sized businesses.

This study is useful to managers of manufacturing SMEs that aim to improve knowledge sharing within his or her group and in turn, improve innovation outputs, with the mind of continuing survival despite how turbulent the environment of operations may be. For scholars, this study serves as a source that provides a synthesis of several articles related to knowledge sharing, innovation and sustainability. In filling the literature gap of producing a synthesis on the relationship between knowledge sharing and innovation management, the study produced new insights which scholars may further build on and examine. Most scholars agree that there is a connection between the ability of small and medium-sized enterprise (SME) operators to share knowledge and innovate and the sustainability of their organizations. According to contingency theory, external factors beyond an organization's control can have an impact on its performance and capacity for innovation, which in turn affects the system's effectiveness. In any case, the discussion of how various types of environmental turbulence (market and technological) affect knowledge sharing, innovation, and sustainability is an effort to improve our understanding of contingency theory.

The study's practical implications state that managers of SMEs can benefit from establishing and maintaining strong relationships with consumers as well as employees in order to better acquire and

use key resources like expertise, ideas, and information. In addition, the study tested a number of hypotheses and theories and came to a final conclusion; this has important ramifications for adding to the body of knowledge in the field, particularly as it pertains to how these factors can boost the return of businesses and ensure their long-term viability. Managers can find and build cross-organizational collaboration with important players like employers, customers, colleges, universities, and government business development service centres to promote knowledge sharing; this, in turn, helps SMEs be ready to use technology to improve processes, products, marketing, and management.

Finally, policymakers, pertinent administrative departments, and individual organizations and individuals may all find useful information in this model and the study's findings. This study's findings elicit the positive effects of external disturbances, such as market or technological turbulence, on performance and innovative capacities. Thus, manufacturing sector organizations can use this study's findings to better understand how environmental factors can affect their efforts to create and share knowledge, add value, improve innovation performance, and sustain operations.

7. Limitations and suggestions for future research

This research primarily focuses on SMEs within a state in Nigeria, which limits the applicability of the results and solutions offered. The results provide several interesting insights but also raise issues for future research. In the first place, when thinking about the concept of environmental turbulence, the ability to predict changes is not a very important factor. Also, measuring it as a whole might not show how big of an impact it has since changes in the environment are unpredictable. Hence, future studies can ensure ENVT constructs based on dimension in order to evaluate the technological, market, and competitive intensity, most especially in terms of managerial perceptions.

Furthermore, the study's findings are relevant to states experiencing particular economic and transitional circumstances. It also denotes the existence of people's psychological attitudes that are unique to certain situations. However, it is important to note that a significant portion of the research sample consisted of local Nigerian businesses. This could mean that the results are applicable to everyone. Thus, we can confidently assume that the occurrences and processes under study are also prevalent in nations with economic and social contexts and cultural traits comparable to Nigeria. But how far this generalizability extends is unclear. To re-evaluate and compare the outcomes, the researcher recommends repeating the research.

Finally, since the model offers the potential to lay the groundwork for adding other environmental components, this study is important for academics. Adding more environmental factors could help make this model clearer and more applicable to a wider range of situations. Service-based businesses like banking and telecommunications can also utilize the relationship and model to explore the moderating effects of environmental turbulence. Furthermore, this research can be applied to conduct internal and external comparisons within industries as well as to develop global business strategies.

8. Conclusion

The conclusions are that knowledge sharing and innovation capability jointly influence organizational sustainability, especially during environmental challenges. Furthermore, environmental turbulence significantly impacts the viability and performance development of manufacturing SMEs in Nigeria. Existing research supports the conclusion that knowledge sharing plays a vital role in sustaining organizations. Multinational companies have provided evidence of this positive impact in the progress and survival of manufacturing SMEs in developing nations with stable economies, implying that findings could be replicated in the rest of the geographies within and outside Nigeria.

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Author contributions

BRO; Conceptualization and methodology, Data curation, software, validation, while JNL; Writing review and editing, project administration, and TJS participated in conceptualization, reviewing literature, modifying the survey and ensuring ethical consideration is duly followed, and final approval of the manuscript for submission. All authors have read and agreed to the published version of the manuscript.

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Data availability statement

The data that support the findings of this study are available on request from the corresponding author, (BRO). The data are not publicly available due to restrictions, but can be made available upon reasonable request. Aamir, A., Jan, S. U., Qadus, A., Nassani, A. A., & Haffar, M. (2021). Impact of knowledge sharing on sustainable performance: Mediating role of employee's ambidexterity. *Sustainability*, 13(22), 12788. <https://doi.org/10.3390/su132212788>

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