



DISASTER MANAGEMENT AND RESILIENCE OF SMALL-SCALE ENTERPRISES IN RIVERS STATE, NIGERIA

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Abstract: *The research examined the relationship between disaster management and the resilience of small firms in Rivers State, Nigeria. The ideas of resilience theory constituted the study's foundation. The researchers used a cross-sectional survey to collect data from 268 Port Harcourt, Rivers State small-scale firms. The researchers accomplished this by distributing a structured questionnaire to the subjects. We performed data analysis and hypothesis testing utilising SPSS 27.0. The study's findings reveal a significant association between disaster management and the resilience of small-scale firms in Rivers State. It is prudent to enable small-scale firms in Rivers State to enhance their resilience, adaptability, and sustainability. By adopting the proposed tactics, small firms can surmount obstacles, capitalise on opportunities, and improve the region's economic progress. We advocate for additional research to investigate the long-term effects of these factors on small-scale performance, the distinct requirements of various sectors within the small-scale enterprise's ecosystem, and the contribution of technology in bolstering the resilience of small-scale enterprises against climate change and other emerging challenges.*

Keywords: *Adaptability, Disaster management, Information management systems, Resilience, Risk assessment.*

Introduction

Small and medium firms constitute a substantial share of GDP and the living conditions of millions globally, particularly in developing nations (Alberti et al., 2018; Dahles & Susilowati, 2015; Sabatino, 2016; Williams et al., 2013). Fostering SMEs is an essential strategy to tackle the socio-economic challenges of developing nations, especially high unemployment and poverty (Page & Soderborn, 2015). Resilience and small and medium-sized enterprises (SMEs), both individually and in conjunction, namely the resilience of SMEs, have garnered significant attention from academics and policymakers in recent years (Alberti et al., 2018) and have therefore been the focus of scientific and policy discourse (Linnenluecke, 2017; Williams & Vorley, 2017).

Resilience in small-scale organisations is a complex notion that includes their capacity to endure and recuperate from economic shocks and crises (Korda et al., 2021; Saputra, 2024).

This resilience is essential for their survival and sustained success, particularly in light of their constrained resources relative to larger enterprises (Howard et al., 2022; Cimino et al., 2024). Small-scale firms are essential for fostering economic development and social advancement (Sarkar & Clegg, 2021). Their resilience is crucial for job development, as they are significant employers, especially in developing economies. Governments and NGOs implement resilience through efforts designed to improve anticipatory, absorptive, adaptive, and transformative capacities (Shackleton et al., 2024). The importance of resilience is seen in its utilisation across various domains, including climate change adaptation and socio-political stability in conflict areas.

Rahmi and Mursyidin (2024), in their research on independence and adaptability: fostering resilience and competitiveness for small and medium-sized firms in the digital age, suggested adaptability as an indicator of resilience. Adaptability is a vital indicator of resilience, demonstrating the capacity of systems—be they infrastructures, urban environments, or live organisms to modify and prosper in the face of difficulties (Orkibi, 2021).

Conversely, disaster management is a complex process designed to mitigate the effects of natural disasters on human life and property (Estevão & Costa, 2020). It encompasses synchronised initiatives comprising prevention, preparedness, reaction, and recovery. The rising frequency and severity of natural catastrophes, intensified by climate change, require effective management measures to alleviate their impacts (Sawalha, 2020). This entails utilising technology, systematic management methods, and established methodologies to improve resilience and response capabilities.

Disaster information management systems and risk assessment are essential components of disaster management (Rahman et al., 2024). Disaster information management systems facilitate the collection, processing, and dissemination of critical information before, during, and after disasters, while effective medical management ensures the continuity of healthcare services and the efficient utilisation of resources. Collectively, they constitute a holistic strategy for alleviating the effects of natural disasters.

Akuwudike et al. (2024) analysed climate change and its impact on nano, micro, small, and medium-sized enterprises in South East Nigeria; Hendrik et al. (2024) explored the correlation between entrepreneurial attitude and the flexibility and resilience of business owners amid economic crises. Kawane and Shaw (2024) examined the integration of risk assessment and resilience into a new policy framework for Micro, Small, and Medium Enterprises (MSMEs) in India; Sakijege (2024) analysed disaster recovery and business continuity in the context of MSMEs in Dar es Salaam; Skouloudis et al. (2023) investigated the effects of flooding, preparedness, and resilience capacity among Greek micro-, small-, and medium-sized enterprises in flood-affected regions. This study underscores the paucity of academic literature regarding the relationship between disaster management and the resilience of small-scale firms in Rivers State, Nigeria. This gap is derived from examining the aforementioned studies and the reviewed literature.

Aim and Objectives of the Study

The study aims to examine the relationship between disaster management and resilience of small-scale enterprises in Rivers State, Nigeria. Thus, the following specific objectives are stated:

- To investigate the relationship between information management systems and adaptability of small-scale enterprises in Rivers State, Nigeria.

- To examine the relationship between risk assessment and adaptability of small-scale enterprises in Rivers State, Nigeria.

Research Hypotheses

H₀₁: There is no significant relationship between information management systems and the adaptability of small-scale enterprises in Rivers State, Nigeria.

H₀₂: There is no significant relationship between risk assessment and adaptability of small-scale enterprises in Rivers State, Nigeria.

Disaster Management

Disaster management poses substantial risks to global societies. Efficient disaster management is essential to alleviating these effects and fostering resilience. Effective disaster management strategies encompass risk assessment and early warning systems, infrastructure development and land-use planning, community preparedness and education, emergency response and coordination, and post-disaster recovery and reconstruction (Sanders, 2023).

Disasters impose severe repercussions on small enterprises, resulting in permanent or temporary closures, relocations, and food insecurity for the families of business owners (Khan & Sayem, 2013). Business recovery is typically accomplished through loans from neighbours, relatives, moneylenders, and, to a lesser degree, microfinance institutions.

Disaster management strategies are multidisciplinary and pertain to social systems rather than natural ones. They emphasize governance for catastrophe mitigation and preparedness, engineering of the built environment, and the social organisation of communities. These approaches prioritise planning with a community rather than planning for it, promoting resilience and involvement (Mayer, 2019; Thomas et al., 2019).

Disaster Information Management System

Disaster information management systems have become essential for efficient disaster management (Khan et al., 2023). These systems amalgamate many technologies and approaches to gather, process, analyse, and communicate essential disaster information (Abbasi et al., 2024). It generally encompasses data acquisition from real-time sensors, satellites, and social media, in addition to historical data regarding previous disasters and vulnerabilities. Abdulaali et al., 2022, employ methodologies such as spatial analysis and geographic information systems to analyse and analyse the data, yielding significant insights. Disaster information management systems depend on information dissemination to provide timely alerts, warnings, and advisories using several channels such as SMS, email, social media, and public address systems (Kato et al., 2024). Decision support technologies, such as analytical instruments and scenario modeling, facilitate informed decision-making in disaster response and recovery. Disaster information management systems have various advantages, such as improved decision-making, greater stakeholder coordination, expedited response times, efficient resource allocation, and effective risk assessment and mitigation (Manunog et al., 2022). We must confront problems including data quality, interoperability, cybersecurity, technological constraints, human factors, and integration with current systems.

Risk Assessment

Hanafi (2009) asserts that risk management/assessment seeks to augment the company's worth by thoroughly addressing organisational issues. Darmawi (2011) characterises it as an endeavour to detect, assess, and manage risks across all company activities, aiming to improve efficiency and effectiveness. This process entails the rational and methodical identification, quantification, assessment of attitudes, formulation of solutions, monitoring, and reporting of risks related to any activity or process (Ferry, 2008).

Every organisation consistently encounters risk, which evolves and intensifies annually by the company's continuous operations. Organisations must attain excellence across all domains and uphold transparency (Richards & Duxbury, 2015). The risk inherent in a project requires a systematic approach wherein a logical decision-making team identifies, analyses, and evaluates risks throughout the project life cycle, employing organisational frameworks and management strategies to mitigate risks for project advantage (Rodrigues-da-Silva & Crispim, 2014).

Resilience

Researchers have identified resilience as an essential element in the entrepreneurial process, with increasing evidence indicating its significance in achieving successful entrepreneurial results, particularly in the sustainability of SMEs (Bullough et al., 2014; Corner et al., 2017; Linnenluecke, 2017). Investigations of corporate resilience advocate for an emphasis on both macro and micro analytical levels (Corner et al., 2017). Conceptual and empirical research highlight the significance of investigating how entrepreneurs demonstrate resilience inside larger companies and enhance community-level resilience (Korber & McNaughton, 2018; McKnight & Linnenluecke, 2016; Williams & Shepherd, 2016). Emerging viewpoints indicate that we may successfully utilise the value and scope of resilience in entrepreneurship to understand its processes and consequences, while also providing direction for management and business overall.

Organisations aiming to prepare, recover, and adapt to crises, shocks, and other adverse events frequently regard organisational resilience—the ability to respond, adapt, and transform—as a valuable attribute (Kantur & Iseri-Say, 2012; Linnenluecke & Griffiths, 2010; Sutcliffe & Vogus, 2003). The ability to manage substantial setbacks is crucial for entrepreneurial firms, which often encounter extensive repercussions from internal crises and external shocks, such as resource depletion, fluctuations in productivity, and employee stress (Gill, Picou, & Ritchie, 2012; Graham, 2007).

Adaptability

Shane (2000) defines organisational adaptability as the ability of an organisation to accept change or to be modified to align with a transformed environment. Adaptability is perceived not as a singular event of organisational change but as an ongoing process throughout an organization's life cycle, as it perpetually learns and adjusts in accordance with environmental dynamics. Shane (2000) emphasises that adaptation constitutes a process of organisational transformation that must be implemented within the framework of a continuous progression of human and organisational enhancement over time. This allows an organisation and its personnel to efficiently adjust to environmental changes.

The firm's ability to modify its comprehension of market expectations, which enhances with the expansion of firm borders, is another definition of adaptability (Lockett et al., 2011). A heightened comprehension and subsequent exposure to novel entrepreneurial chances are

essential precursors to the concrete entrepreneurial actions made to seize opportunity value (Hitt et al., 2001). This study indicates that a lucrative new opportunity, however unknown (Shane, 2000), precedes organisational adaptability. Consequently, opportunity recognition is not intrinsic to the entrepreneurial framework, yet it is an essential prerequisite for the inception of entrepreneurship.

Theoretical framework

Resilience Theory

Resilience theory examines the capacity of individuals, groups, and systems to adapt to and recuperate from adversity (Van Breda, 2001). It emphasises the ability to recover from difficulties, gain insights from failures, and become more resilient than prior (Carlson et al., 2012).

Resilience theory is particularly pertinent to this study as it specifically examines the capacity of small-scale firms (SMEs) to endure and recuperate from natural disasters. This theory offers a comprehensive framework for examining the elements that enhance the resilience of SMEs in Rivers State, Nigeria.

Resilience theory is particularly pertinent since it directly addresses the ability of SMEs to adapt and recuperate from disruptions, which corresponds to the effects of natural disasters. It also takes into account several elements, including social capital, institutional capacity, and adaptive capacity, which are essential for SMEs' resilience (Southwick et al., 2014; Van Breda, 2018). Furthermore, it can assist in identifying methods to bolster SMEs' resilience, including diversifying revenue streams, cultivating robust partnerships, and investing in catastrophe preparedness.

Although resilience theory provides a useful paradigm, it possesses specific limitations (Leichenko et al., 2018; Strier, 2021). Resilience is a multifaceted notion with various aspects affecting it, complicating the isolation and measurement of certain elements. Factors influencing resilience may alter based on geographical location, cultural elements, and economic circumstances. Gathering dependable and extensive data on the resilience of SMEs, particularly in developing nations such as Nigeria, poses challenges due to data shortages and quality concerns. Evaluating the enduring effects of resilience-building activities may necessitate prolonged periods of observation and analysis.

Notwithstanding these constraints, resilience theory continues to be an essential framework for comprehending and tackling the difficulties encountered by SMEs during natural disasters. By meticulously evaluating these constraints and integrating additional pertinent theories, researchers can better understand the elements that foster or impede SME resilience.

Empirical Review

Gautam and Gautam (2024) examined stress and resilience among migrant entrepreneur-managers of small and medium firms during the COVID-19 pandemic. This research utilises a qualitative design founded in theory. A semi-structured interview questionnaire was employed for individual interviews with 20 migrant entrepreneur-managers across 10 distinct business sectors during the height of the COVID-19 pandemic in 2020 and 2021. Interviews were transcribed and categorised into open code, axial code, and selected code to discern the principal themes, and analysis was conducted at three levels to investigate the stressors and the techniques employed to manage the crisis. The reliability of the findings was guaranteed

through credibility, transferability, dependability, confirmability, and reflexivity. This study examined three categories of stressors: financial, supply-related, and human resources-related stressors affecting migrant SME entrepreneur-managers during the COVID-19 pandemic. The study demonstrated that migrant SME entrepreneur-managers employed robust supply chain techniques to address crises such as the COVID-19 epidemic.

Ghaderi et al. (2024) investigated the crisis resilience of small-scale tourism enterprises during the pandemic, focusing on the Yazd World Heritage Site in Iran. The research performed comprehensive interviews with 25 operators, uncovering their opinion of the pandemic issue as a trigger for previous political and economic crises. Diverse business operators implemented a range of resilience tactics, encompassing closure, survival, adaptation, and innovation. The findings further validated that integration and unity enhanced businesses' resilience when facing challenges collectively. The study additionally revealed that the pandemic fostered beneficial social outcomes, including cooperation and solidarity among small enterprises, notwithstanding adverse effects. Moreover, the government's supportive policies failed to facilitate healing, and its crisis management strategies lacked transparency and professionalism.

Saputra (2024) assessed strategic combinations of spirituality, humanism, and digitality to enhance the resilience of small-scale family enterprises. This paper explored six hypotheses through a survey-based quantitative analysis including 522 owners and/or managers of SSFB. The investigation indicates that digitality and humanity have a good, direct, and considerable impact on company resilience. Simultaneously, spirituality exerts an indirect influence on business resilience. A coordinated integration of digitality, humanity, and spirituality is advised for fostering resilience in SSFB.

Skouloudis et al. (2023) assessed the flood resilience capacity of Greek small and medium-sized firms by creating and implementing an index. The researchers distributed a structured questionnaire regarding cognitive, managerial, and contextual aspects influencing the capacity to plan for, endure, and recover from flooding disasters to a sample of Greek SMEs situated in three flood-prone regions ($n = 391$). The proposed index implements a bottom-up self-assessment methodology designed to standardise evaluations, ultimately seeking to reduce the susceptibility of SMEs to flooding. Analysing essential internal and external elements that influence the resilience capacity of SMEs is vital, particularly given their constrained resources and the potential for generating single points of failure within complex supply chain networks.

Methodology

The data collection methodology of this study utilised a cross-sectional approach and a random sample technique. We enabled the research implementation by engaging managers and their volunteer personnel, utilising personal networks and professional connections to assist in the recruitment process. The managers utilised a stochastic sampling method to select a group of personnel from the team, with each manager choosing between three to five individuals for participation. Participants must be full-time employees with at least six months of tenure in their current employer. The managers were mandated to assign a distinct code name to each employee who indicated their intention to participate, while the employees were instructed to record their assigned code on their respective questionnaires. We disseminated the surveys to participants via an Internet platform, namely Google Forms. The researcher subsequently obtained the completed surveys by email, utilising the same method

of communication. We provided personalised copies of the questionnaire to those who indicated unhappiness with the usability of Google Forms.

We conducted the staff selection process utilising a random methodology, which may mitigate the effects of common method bias by implementing the leader-member dyad strategy. The sampling process was executed in the urban regions of Port Harcourt and Obio/Akpor. 400 questionnaires were disseminated, with 337 gathered from financial (POS services), real estate, and manufacturing sector participants. Upon sorting and screening the questionnaires, we eliminated those considered invalid. This encompassed a questionnaire with absent items, substandard completion quality, or a failure to attain congruence. We received 268 valid responses, with an effective recovery rate of 79.53%.

The validity assessment in this study relies on the use and modification of instruments from previous research (Brumatti et al., 2021; Murugan, 2015; Rahmi & Mursyidin, 2024), as well as the incorporation of indicators from established theoretical frameworks and operational definitions of the constructs under investigation. The instruments include content-based validity. This study employed the Cronbach's alpha coefficient to assess the test's reliability. The recommended benchmark of 0.70, as indicated by Nunnally (quoted in Sekaran, 2003), is frequently utilised to evaluate the instrument's reliability. A reliability coefficient greater than 0.70 signifies a high degree of reliability, whereas a number below 0.70 implies inadequate reliability (Bryman & Bell, 2011). All reliability coefficients for the instrument exhibited values surpassing 0.70. We performed data analysis and hypothesis testing utilising SPSS version 27.0. We conducted a descriptive statistical analysis to illustrate the fundamental properties of the sample. We employed a Spearman rank-order correlation coefficient to examine the association between transformational leadership style and the monetary awards obtained by employees, ascertaining the relevance of the study variables.

Result and Discussions

Descriptive statistical analysis facilitates the extraction of demographic variables pertaining to the participants in the chosen sample. The present study involved the statistical analysis of the gathered sample data, yielding descriptive statistics as illustrated in Table 1. Upon evaluating 268 samples, we categorised 140 individuals (52.24%) as male and 128 individuals (47.76%) as female. The average age of the participants was 30.62 years, with the predominant age group being 26–40 years, comprising 77.20% of the sample. Most participants in the survey possessed either a high school diploma or a bachelor's degree, accounting for 86.6% of the sample. The proportions of single individuals (42.52%) and married individuals (57.46%) exhibited no statistically significant difference.

Table 1: Descriptive statistical analysis (N = 268)

	Characteristics	Option	Frequency	Percentage
Gender		Male	140	52.24%
		Female	128	47.76%
Age		21-25 years old	36	13.43%
		26-30 years old	126	47.01%
		31-40 years old	95	35.45%
		41-50 years old	11	4.10%
Education		SSCE/WAEC	94	35.08%
		B.Sc.	172	64.18%
		Masters or above	2	0.75%
Marital Status		Single	114	42.54%
		Married	154	57.46%

TESTING OF RESEARCH HYPOTHESES

H₀₁: There is no significant relationship between information management systems and adaptability

Table 2: Analysis of the effect of *information management systems (IMS)* on *Adaptability (ADY)*

		Correlations	
		IMS	ADY
Spearman's rho	IMS	Correlation Coefficient	1.000
		Sig. (2-tailed)	.
		N	268
	ADY	Correlation Coefficient	.829
		Sig. (2-tailed)	.003
		N	268

Source: SPSS 27.0 Output

The results in Table 2 indicate a Spearman correlation coefficient of 0.829, signifying a positive linear link between information management systems and adaptability. The correlation test yielded a statistically significant result, with a p-value of 0.003. The association between information management systems and adaptability is positive, indicating that an enhancement in information management systems results in a proportional rise in adaptability.

The study reveals a significant correlation between information management systems and flexibility. The null hypothesis was rejected; hence, the alternative hypothesis, which indicates

a substantial positive correlation between information management systems and staff flexibility, was endorsed.

Hypothesis Two

H₀₂: There is no significant relationship between risk assessment and adaptability

Table 3: Analysis of the effect of risk assessment (RKA) on adaptability (ADY)

		Correlations		
			RKA	ADY
Spearman's rho	RKA	Correlation Coefficient	1.000	.784
		Sig. (2-tailed)	.	.000
		N	268	268
	ADY	Correlation Coefficient	.784	1.000
		Sig. (2-tailed)	.000	.
		N	268	268

Source: SPSS 27.0 Output

The Spearman correlation coefficient is calculated as 0.784, as indicated in Table 3. This research indicates a positive association between good risk assessment. The correlation analysis yielded a statistically significant result ($p = 0.000$). This study establishes the p-value as statistically significant at a significance level of 0.05. A positive correlation exists between the degree of risk assessment and the level of adaptability among employees.

The study's findings demonstrate a substantial link between risk assessment and employee adaptability, suggesting a relationship between these variables. The failure of the null hypothesis endorses the alternative hypothesis, indicating a strong and positive correlation between risk assessment and employee flexibility.

Discussions of Findings

We used Spearman's rank correlation coefficient within the Statistical Package for the Social Sciences Software Version 27.0. Identifying a robust favourable correlation between information management systems and the adaptability of small-scale firms in Rivers State, Nigeria, is a noteworthy advancement. This discovery indicates that proficient information management might serve as a significant catalyst for the growth and sustainability of these enterprises.

Utilising information management systems enables small firms to make more informed decisions (Roffia & Dabić, 2024). Real-time data regarding market trends, client preferences, and operational performance enables these businesses to make strategic decisions grounded in evidence rather than intuition (Megdad & Çağlar, 2024). This data-centric methodology mitigates risks and enables small firms to exploit emerging possibilities (Tukamuhabwa et al., 2024).

Information management systems can promote creativity and flexibility (Lin et al., 2024). They foster a culture of innovation by promoting knowledge exchange and cooperation (Mollajan et al., 2024). Small-scale firms may adapt swiftly to evolving market conditions and client demands, maintaining relevance and competitiveness (Kuo, 2024; Sreenivasan & Suresh, 2024).

Hypothesis 2 reveals a substantial and positive correlation between risk assessment and the adaptability of small-scale firms in Rivers State, Nigeria, a finding with significant implications. Risk assessment equips SMEs to make educated decisions that match their risk tolerance and strategic objectives (Inan et al., 2023). By proactively identifying and assessing possible risks, these enterprises may formulate effective contingency plans and resource allocation methods to mitigate them. This proactive strategy improves their readiness to respond promptly and efficiently to unforeseen issues (Sandoval et al., 2023).

Moreover, risk assessment cultivates a culture of resilience among small and medium-sized enterprises (SMEs). By deriving insights from previous experiences and setbacks, these enterprises can recover with enhanced resilience and adaptability. This resilience is essential for maneuvering through the volatile and frequently uncertain corporate environment (Wang et al., 2024).

This discovery has significant ramifications for multiple stakeholders. Policymakers can enhance risk assessment techniques among SMEs by implementing training programs, workshops, and financial incentives (Elkhouly et al., 2024). Business support agencies offer consulting services and tools to assist SMEs in performing comprehensive risk assessments and formulating adaption strategies. Small and medium-sized enterprises should prioritize risk assessment as an essential business function and include it in their decision-making processes.

Conclusion

The correlation between natural disaster management and the resilience of small-scale firms in Rivers State, Nigeria, is significant. Given the state's susceptibility to numerous natural disasters, including flooding and erosion, small-scale firms must formulate efficient measures to alleviate their effects. Small firms can markedly improve their resilience by implementing comprehensive catastrophe management strategies. The plans must encompass risk assessments, emergency response protocols, business continuity measures, and insurance provisions. Small firms can reduce operational disruptions and financial losses by proactively addressing possible dangers.

Moreover, governmental assistance and cooperation with pertinent agencies can substantially enhance the resilience of small-scale firms. Facilitating access to financial aid, technical proficiency, and infrastructure enhancement can enable these enterprises to recuperate from calamities and reconstruct more robustly and swiftly.

In summary, including natural disaster management strategies in the operations of small-scale firms in Rivers State is crucial for their enduring sustainability. By implementing preventive strategies and cultivating robust relationships, these enterprises can endure the effects of natural disasters and emerge more formidable and resilient.

Recommendations

In Rivers State, Nigeria, we might adopt various ideas to enhance the positive correlation between natural disaster management and the resilience of small-scale enterprises:

- i. Government programs should prioritize enhancing digital literacy, providing inexpensive technology access, and subsidizing software and cloud services. Moreover, investing in resilient digital infrastructure and creating specialised support centres can substantially improve small firms' digital competencies.
- ii. Small-scale firms ought to adopt proactive measures to improve employee health and well-being. Implementing comprehensive wellness programmes encompassing physical, mental, and emotional health, promoting regular health assessments and immunizations, and providing flexible work arrangements can

- substantially enhance employee happiness and productivity. Furthermore, offering counseling, mental health services, and developing ergonomic workspaces can foster a better and more comfortable work atmosphere.
- iii. Small-scale firms must prioritize business continuity strategies, sufficient insurance coverage, and routine risk evaluations. Formulating emergency response strategies, diversifying supply networks, and collaborating with other enterprises can augment their resilience.
 - iv. Government initiatives must formulate comprehensive catastrophe preparedness and response strategies, invest in sophisticated early warning systems, and prioritize infrastructure enhancement. Furthermore, offering financial assistance and capacity-building initiatives can enable small-scale firms to recuperate from disasters and reconstruct more resiliently.

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