Volume: 10 Issues: 76 [September, 2025] pp. 648 -660
Journal of Islamic, Social, Economics and Development (JISED)
eISSN: 0128-1755
Journal website: www.academicinspired.com/jised
DOI: 10.55573/JISED.107649

BUILDING ORGANIZATIONAL RESILIENCE IN MALAYSIAN FOOD AND BEVERAGES INDUSTRY: SCALE DEVELOPMENT AND VALIDATION

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Article history
Received date : 11-7-2025
Revised date : 12-7-2025
Accepted date : 7-9-2025
Published date : 25-9-2025

To cite this document:
Baharuddin, N. F., & Wan Omar, W. M. (2025). Building organizational resilience in Malaysian food and beverages industry: Scale development and validation. *Journal of Islamic, Social, Economics and Development (JISED),* 10 (76), 648 – 660.

Abstract: *The COVID-19 pandemic has compelled organisations to explore new ways of managing work and the environment. The dynamics of resilience in adopting digital technology have become increasingly important in the face of various challenges, including natural disasters, terrorism, economic recessions, mass migration, cyber threats, and other socio-political and economic trends. This study aims to develop an instrument and empirically validate the measurement of the organizational resilience dimensions. The instrument was developed through a structured process, starting with the identification of organizational resilience dimensions, item generation, questionnaire development, pre-testing, pilot testing, and scale validation. Six industry experts and three academic experts were involved in the pre-test phase to assess the instrument's content. In the phase of pilot test, data were collected from 100 SMEs in the food and beverage industry located on the East Coast of Malaysia. The reliability and validity of the instrument were assessed through Cronbach's Alpha and Exploratory Factor Analysis (EFA). The final framework comprises of four dimensions that were modelled as independent variables; dynamic capability, marketing agility capability, strategic flexibility, and relative advantage, with organizational resilience as the dependent variable. Consequently, a reliable measurement tool for organizational resilience was established and empirically validated prior to conducting the main survey. This tool can support businesses in identifying their strengths and weaknesses, guiding them toward long-term sustainability and competitiveness. The instrument is expected to assist future researchers and SMEs in assessing and enhancing organisational resilience in dynamic environments.*

Keywords: *Organisational resilience, SMEs, Instrument development, Scale validation*

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Introduction

Given the current international economic, social, and environmental changes that occur quickly and frequently, the idea of organisational resilience is very important (Do et al., 2022). Resilience of an organisation is the capacity to bounce back from failures and adjust to change (Akpan et al., 2022; He et al., 2022a). The cornerstone to systems resilience is interdependencies, which firms and stakeholder groups must cultivate and adopt new methods to create stability and flexibility against external shocks (Do et al., 2022). Although the majority of SMEs are starting to see how useful circular business practices are for fostering resilience (Annarelli et al., 2020), there are still major obstacles to their long-term adoption, which affects adoption rates.

According to Annarelli et al. (2020), companies must therefore take action to improve organisational resilience in order to maintain competitiveness and guarantee long-term viability. This article presents a framework for evaluating the effectiveness of organisational resilience plans and associated initiatives in the service sector (Marcucci et al., 2022). Businesses must deal with a plethora of new digital technology adoptions that are growing more significant and connected to the main topics of cyber security and digital transformation, as described in the above framework (Annarelli et al., 2020). The majority of researchers concur that organisational resilience is a strong competency linked to the ability to successfully absorb, adjust to, and ultimately benefit from disruptive surprises that could jeopardise sustainability, despite the fact that there is no universally accepted definition of the term (Xia et al., 2022). Lack of scale for measuring dimensions of organizational resilience may create difficulties to understand how the organizations will be resilient. Therefore, this study intends to develop an instrument and empirically validate the measurement of the organizational resilience dimensions.

The remainder of this paper is organized as follows. The next section provides a brief review of the relevant literature on the dimensions of organizational resilience. This is followed by the research methodology section. Subsequently, the paper presents the data analysis based on a pilot test and exploratory factor analysis. The major findings are then discussed in the next section. Finally, the paper concludes with a discussion of research implications and directions for future research.

Literature Review

A comprehensive review of organizational resilience literature has led to the identification of four essential dimensions for organizational resilience practices. Each of these dimensions is discussed in detail in the subsequent paragraphs.

Organizational Resilience

Organizational resilience is not just about surviving disruptions but thriving through them. According to Zhang et al. (2021), organisational resilience is the capacity of an organisation to withstand significant business disruptions brought on by unforeseen or catastrophic events, enabling its systems to continue operating beyond typical operational boundaries without suffering significant losses. Several scientific fields have gradually adopted the idea of resilience (Tengblad, 2020). Resilience, for instance, is a crucial idea in ecology that describes how ecosystems preserve their essential roles and stability in the face of outside stress and change (Akpan et al., 2022). Organizational resilience is crucial for navigating today's volatile,

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uncertain, complex, and ambiguous (VUCA) business environment; thus, managers should focus on building resilient systems by fostering adaptive cultures, investing in learning and development, and designing flexible processes (Su & Junge, 2023). In this study, four key dimensions of organizational resilience are identified: dynamic capability, marketing agility capability, strategic flexibility, and relative advantage. The following paragraphs will provide a detailed discussion of each of these dimensions.

Dynamic Capability

Dynamic capabilities describe an organization's capacity to detect, capture, and reconfigure resources and competencies in response to a changing environment (Yunita et al., 2023). According to Teece et al. (1997), these capabilities play a crucial role in driving organizational resilience, particularly among SMEs. They empower SMEs to anticipate and respond to emerging challenges and opportunities with agility and effectiveness. For example, an SME with strong dynamic capabilities might identify the benefits of integrating new digital technologies to improve operational efficiency and expand its customer reach, thereby strengthening its resilience during periods of market disruption or economic uncertainty. SMEs with dynamic skills are more able to recognise changes in their environment, seize new opportunities, and modify their operations and plans as necessary (Canhoto et al., 2021). Their ability to adapt makes them more resilient, allowing them to withstand setbacks and bounce back from difficulties more skilfully (Akpan et al., 2022). The interdependent relationship between organisational resilience and dynamic capabilities emphasises how important it is to continue developing in both areas to guarantee SMEs' competitiveness and long-term growth in the quickly changing business environment of today.

Marketing Agility Capability

According to Kalaignanam et al. (2021), marketing agility is the capacity of a company to continuously modify and realign its strategic direction in order to produce value, especially through flexibility during phases of innovation and development. How successfully businesses can adapt and thrive in the face of quickly shifting business conditions is largely determined by the relationship between marketing agility competence and organisational resilience (Hajli et al., 2020). According to Kalaignanam et al. (2021), SMEs' resilience is greatly increased by marketing agility. SMEs can quickly adapt their product offers, advertising techniques, and distribution systems to meet changing market demands by maintaining flexibility in their marketing efforts (Thoumrungroje & Racela, 2021). Businesses can create successful reactions to changing customer preferences and demands by using marketing agility, which makes it easier to detect and obtain insightful information (Audretsch & Belitski, 2021). SMEs could, however, run into internal resistance, especially when they are dealing with the uncertainty of implementing digital transformation in their organisational procedures. In order for SMEs to identify and take advantage of external opportunities, external networks are essential (Ara Shaikh et al., 2021). In addition to promoting a culture of ongoing learning and adaptation, SMEs' capacity for marketing agility enables them to stay sensitive to client expectations, market dynamics, and innovation trends (Thoumrungroje & Racela, 2021). By improving organisational resilience, this flexibility helps SMEs deal with upheavals and come out stronger on the other side.

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Strategic Flexibility

According to Arfeen et al. (2023), strategic flexibility is the ability of a company to adapt to changing conditions by realigning its objectives, expertise, and capabilities. This adaptability helps the organisation to adjust to changes both inside and outside the company which aids in the development of future strategies (Batubara et al., 2018). In the context of digital transformation, it entails taking a fundamental stance on competition. Strategic flexibility gives businesses a competitive edge by enabling them to consider a variety of possibilities when making decisions in intricate and quickly evolving settings (Klein & Todesco, 2021). In order to ensure the successful implementation of digital transformation and long-term market survival, a firm's ability to adapt to changes in the business environment can be considered strategic flexibility. Strategic flexibility gives SMEs the capacity to investigate novel approaches, manage resources effectively, foresee and adjust to changes in the external environment, and function with agility (Nyamrunda & Freeman, 2021). When combined, these skills help SMEs become more resilient as an organisation, allowing them to withstand setbacks, bounce back quickly, and thrive in the face of uncertainty.

Relative Advantage

According to Makovhololo and Batyashe (2017), relative advantage is the extent to which an innovation is thought to be better than the earlier techniques or technologies it replaces, especially in terms of advantages, performance, or efficiency. Rogers (2003) asserted that this idea is a major determinant of SMEs' adoption of innovations. SMEs are more likely to embrace an innovation if it is perceived as offering a clear and significant improvement over existing procedures. SMEs can learn more about consumer behaviour and industry trends by utilising technology like artificial intelligence (AI) and machine learning (Spann et al., 2022). It is clear from taking these things into account that SMEs can benefit greatly from digital transformation. According to Makovhololo and Batyashe (2017), relative advantage has a significant impact on the adoption of innovations, the readiness to invest in cutting-edge technologies, and the capacity to adapt successfully to disruptions. In addition to increasing operational efficiency, SMEs fortify their organisational resilience and set themselves up for long-term success when they recognise and embrace innovations that offer definite advantages.

Table 1: Limitations in Prior Studies

Author/Year	Focus of Study	Limitations
Ali et al. (2021)	Supply chain resilience strategies in F&B SMEs amid COVID-19	Literature review only; lacks empirical data on diverse Malaysian F&B contexts
Yusoff et al. (2021)	Role of government financial support, risk propensity, and confidence on venture resilience	General SME context—does not isolate F&B industry dynamics
Najib et al. (2021)	Survival of small and medium restaurants through crises via support and innovation	Based on Indonesian data—not directly generalizable to Malaysian context
Mohezar et al. (2023)	Supply-chain risk and business continuity strategies (BCM)	Very small, qualitative sample; COVID-specific period.
Ramli et al. (2024)	Supply-chain risk management for recovery and continuity	Not sector-specific; varying industries reduce F&B specificity

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Table 1 highlights the prior studies on building organizational resilience, particularly within Malaysia's F&B context have converged on several recurring drivers: supply-chain agility (e.g., supplier diversification, inventory buffers, and collaboration with logistics partners), supply chain risk and business recovery. Government support (grants, advisory services), financial support and adherence to standards (including halal, food safety SOPs) also emerge as enabling conditions. Thus, key gaps were found such as limited longitudinal evidence on how resilience capabilities are built and sustained post-pandemic; under-examination of human capital and employee well-being as resilience mechanisms; insufficient integration of digital, supply-chain, and governance factors in a single empirical model; and weak generalisability and not sector specific. Future research should adopt mixed-methods, track outcomes over time, and test integrative models across diverse F&B tiers (micro to medium) and geographies.

Methodology

The processes of scale development and validation have been well established in previous studies. Many researchers have widely adopted the guidelines proposed by scholars such as Churchill (1979) and Hensley (1999) for this purpose. In the context of this study, the scale was developed through several stages, including the identification of factors, generation of items, pre-testing, pilot testing, and final validation of the scale, as illustrated in Figure 1.

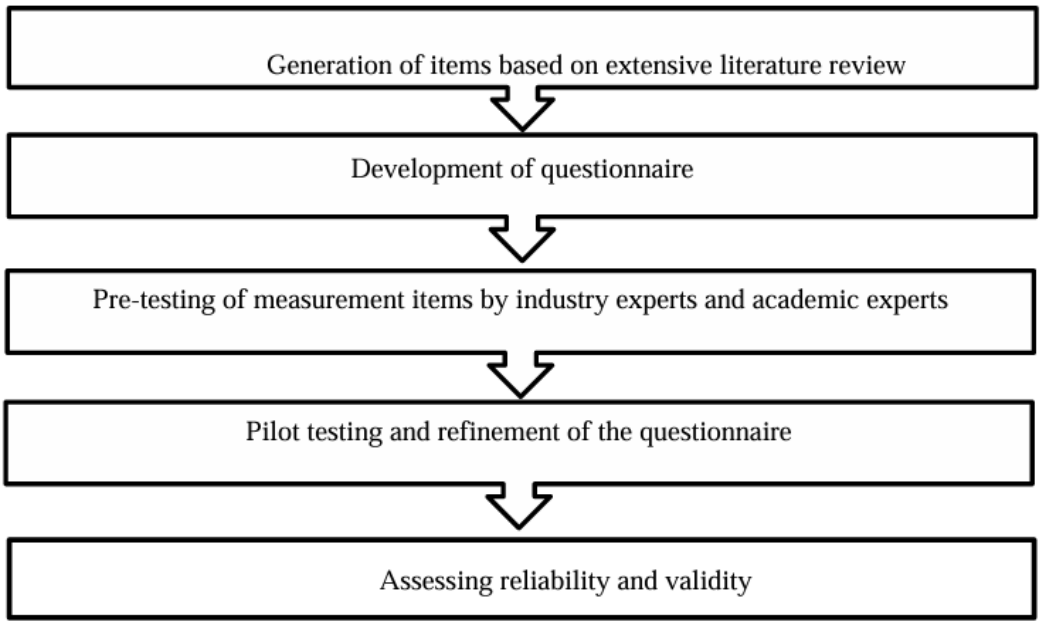

Figure 1: Research Process of Scale Development

Generation of Items

An initial pool of 34 items was generated through an extensive review of existing literature. These items were adopted and adapted from prior studies that employed validated measurement instruments, as outlined in Table 2. This study utilized a 7-point Likert scale for assessment. As supported by Diefenbach et al. (1993), the 7-point scale has been identified as the most effective overall, with respondents finding it both accurate and user-friendly. The scale consists of statements rated from "strongly disagree" (1) to "strongly agree" (7).

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Table 2: Number of Items Used to Measure Variables

Variable	No of Items	Source
Organizational Resilience	7	Akpan et al. (2022); Saqib et al. (2020)
Dynamic Capability	7	Akpan et al. (2022)
Marketing Agility Capability	7	Zhou et al. (2019)
Strategic Flexibility	6	Hock-Doepgen et al. (2021)
Relative Advantage	7	Wanyoike et al. (2012)

Pre-testing

The purpose of the pre-test is to enhance the content validity of the survey instrument by evaluating the relevance of each variable item and validating the proposed items through the expert opinions of industry professionals and academics. For this phase, six industry experts and three academic experts were selected. The organizations involved in the pre-test were based in Kelantan, Terengganu, and Pahang. They were chosen from management positions, such as top management, managers, and supervisors, based on their extensive experience in the food and beverages industry. The participating organizations have been operating for over five years and possess substantial expertise in the sector. The academic experts, on the other hand, have comprehensive knowledge of SMEs. Therefore, this group was considered highly qualified to assess the survey instrument. The expert feedback led to revisions for improved clarity, with seven items requiring modification.

Pilot Test

A pilot test was conducted to assess the inter-item internal consistency and reliability of the measured items. In response to the feedback received during the pre-test stage, the questionnaire was revised and modified. The sample for this study comprises Small and Medium Enterprises (SMEs) without restriction on firm size or years of operation, in order to capture a more comprehensive representation of the SME sector. The revised questionnaire was distributed to SMEs that were randomly selected and registered with SMECorp, located on the East Coast of Malaysia. The SMEs were approached online, and the survey was shared through email and the WhatsApp application. A total of 100 completed questionnaires were collected from the respondents who were willing to participate in the survey. Hill (1998) stated that a pilot test can be carried out with a sample size of 10 to 30 people. Consequently, it is thought that the current study's sample size of 100 respondents is more than sufficient. A reliability test was conducted to evaluate the internal consistency of the measurement items. The results of this test are detailed in the findings section.

Data Analysis and Findings

The collected data were carefully examined to ensure accuracy and completeness, with checks for data entry errors and missing values. Subsequently, the data were analysed. The results details are shown in Tables 3,4 and 5. The majority of respondents (39%) were affiliated with Private Limited Companies (Sdn Bhd), followed by those from Partnership firms (32%) and Sole Proprietorships (29%). In terms of job positions, 30% of the respondents were supervisors, while 20% held managerial roles. With regard to experience in the food and beverage (F&B) industry, 45% of the participants had five years or less of experience, and 35% had between six to ten years of experience.

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Table 3: Distribution of Respondent by Ownership

Ownership	Respondents	Percentage
Private Limited Companies	39	39
Partnership	32	32
Sole Proprietorships	29	29

Table 4: Distribution of Respondent by Position

Position	Respondents	Percentage
Director	18	18
Manager	20	20
Business owner	13	13
Supervisor	30	30
Executive officer	19	19

Table 5: Distribution of Respondent by Years of Experience

Years of Experience	Respondents	Percentage
5 years or less	45	45
6 – 10 years	35	35
11 – 15 years	20	20

Instrument Validation

The reliability and validity of the scale are evaluated using Cronbach's Alpha (α) to assess internal consistency while Exploratory Factor Analysis (EFA) is used to examine the underlying factor structure.

Assessment of Reliability

Cronbach's Alpha (α) is widely recognized as the most commonly used method for assessing the reliability of measurement scales, including internal consistency (Nunnally & Bernstein, 1994; Sekaran & Bougie, 2016). As shown in Table 6, all constructs' variables recorded Cronbach's α values above 0.7, indicating strong internal consistency and suitability for the study. Although the relative advantage construct yielded a slightly lower value of 0.794, it is still considered acceptable. According to Pallant (2001) and Nunnally and Bernstein (1994), a Cronbach's alpha value exceeding 0.6 can be deemed reliable and acceptable, thus confirming the internal consistency of the constructs.

Table 6: Reliability Analysis

Constructs	Cronbach's Alpha	N of Items
Organizational Resilience	0.880	7
Dynamic Capability	0.893	7
Marketing Agility Capability	0.896	7
Strategic Flexibility	0.914	6
Relative Advantage	0.774	7

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Assessment of Validity – Exploratory Factor Analysis (EFA)

Exploratory factor analysis (EFA) was conducted in this study to structure the measurement of constructs, e.g., how many factors the study should have, and which factors are loaded on which constructs (Ferguson & Cox, 1993). Furthermore, EFA is also used to describe and summarise the data by grouping together the variables that are correlated and to determine the sub-factors that underline a set of items measuring each theoretical construct and dimensions of a nomological network suited to the research context (Kline, 2010). EFA is performed using principal axis factoring as the extraction method and varimax with Kaiser normalisation as the rotation method to determine the underlying factors. The pilot test data were used to perform the analysis. A widely recommended guideline for conducting Exploratory Factor Analysis (EFA) is to ensure a sample size of at least 5 to 10 respondents per variable, with a total sample not falling below 100 to 200 participants (Hair et al., 2019). Prior to performing EFA, it is essential to evaluate whether the data are suitable for factor analysis. This can be done using the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's Test of Sphericity. A KMO value above 0.70 is typically deemed acceptable, and a significant result from Bartlett's test ($p < 0.05$) suggests that the correlation matrix is appropriate for factor extraction and not an identity matrix (Field, 2018). To check the suitability of the data for factor analysis, the results are based on the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) and Bartlett's Test of sphericity (BTOS). As shown in Table 6, KMO value of above 0.60 (Kaiser, 1974) and a Bartlett's test of sphericity with p value less than 0.05 (Bartlett, 1950) are used as indicators. The EFA yielded 0.912 for the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy, indicating that the factor analysis was suitable. The Chi-square was about 2998.991 and df of 561 with p-value < 0.001 for the Bartlett's test of sphericity, indicating no difficulties with inter-matrix correlations (Hairetal, 2019).

Table 7: KMO & Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.912
Bartlett's Test of Sphericity	Approx. Chi-Square	2998.991
	df	561
	Sig.	0.000

The results showed a 5th factor solution with eigenvalues greater than 1.0. Due to low factor loadings, 2 of the 34 items were eliminated, leaving a total of 32 items and 5 factors for the organizational resilience measuring model. Table 8 shows the factor loadings which are above 0.5.

Table 8: Results of Exploratory Factor Analysis

Items	**DC**	**MAC**	**OR**	**RA**	**SF**
DC1	0.815				
DC2	0.700				
DC3	0.744				
DC4	0.782				
DC5	0.747				
DC6	0.867				
DC7	0.805				
MAC1		0.777			

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MAC2	0.695				
MAC3	0.758				
MAC4	0.750				
MAC5	0.797				
MAC6	0.811				
MAC7	0.896				
OR1		0.728			
OR2		0.697			
OR3		0.736			
OR4		0.740			
OR5		0.821			
OR6		0.816			
OR7		0.801			
RA1			0.804		
RA2			0.781		
RA3			0.783		
RA4			0.775		
RA5			0.808		
SF1				0.876	
SF2				0.872	
SF3				0.886	
SF4				0.755	
SF5				0.818	
SF6				0.815	

Discussion

This study contributes to the growing body of literature on organizational resilience by offering a validated measurement instrument tailored for SMEs in the Malaysian food and beverage industry. The identification and empirical validation of four core dimensions; dynamic capability, marketing agility capability, strategic flexibility, and relative advantage, offer a comprehensive model for understanding how SMEs can enhance resilience in increasingly volatile and unpredictable environments. Dynamic capability emerged as a critical factor, reaffirming its role in enabling SMEs to sense and seize opportunities, as well as to reconfigure internal resources in response to environmental shifts. This is consistent with Teece et al. (1997) and further supported by recent research (Yunita et al., 2023; Akpan et al., 2022), emphasizing the necessity for SMEs to build adaptive and innovative competencies. Marketing agility capability was also found to significantly influence resilience, highlighting the importance of responsiveness and adaptability in marketing strategies. SMEs that rapidly align their offerings and communication channels with market demands are more likely to remain competitive during crises. This supports prior findings of Kalaignanam et al. (2021) and Thoumrungroje and Racela (2021), which identified marketing agility as a driver of resilience in dynamic markets. Strategic flexibility reinforces the idea that the ability to pivot organizational strategies in response to internal and external pressures is vital. In alignment with Arfeen et al. (2023) and Batubara et al. (2018), the study suggests that SMEs with flexible strategic planning processes are better equipped to navigate uncertainties and sustain long-term growth. Lastly, relative advantage was validated as a key dimension, indicating that the

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perceived benefits of innovation adoption especially through digital transformation can significantly enhance resilience. The study's results echo Rogers' (2003) diffusion of innovation theory, affirming that SMEs are more likely to adopt transformative technologies when clear value propositions are evident. The results also confirmed strong internal consistency across all dimensions, with Cronbach's alpha values exceeding the acceptable threshold of 0.7. Exploratory Factor Analysis (EFA) supported the construct validity, and the model showed robust statistical reliability and empirical relevance. This research not only bridges theoretical gaps in the resilience literature by providing an empirically tested scale but also offers practical implications. SME owners, managers, and policymakers can use the validated instrument to assess resilience capabilities, identify gaps, and implement targeted strategies to strengthen business sustainability and competitiveness.

Conclusion and Implication

This study has successfully developed and validated a reliable measurement instrument to assess organizational resilience practices among SMEs in the food and beverage industry in Malaysia. Through a rigorous process involving literature review, expert validation, pre-testing, pilot testing, and statistical analyses using Cronbach's Alpha and Exploratory Factor Analysis (EFA), five key constructs were identified: organizational resilience, dynamic capability, marketing agility capability, strategic flexibility, and relative advantage. The results confirm that these constructs are internally consistent and statistically valid for measuring organizational resilience. The instrument can serve as a valuable tool for SME practitioners, policymakers, and researchers in identifying resilience strengths and weaknesses within the SME sector. By focusing on these dimensions, SMEs can enhance their ability to adapt, respond, and thrive amidst business disruptions and digital transformation challenges. The study offers a robust and contextually grounded tool for measuring organizational resilience, with implications that extend across academic, managerial, and policy-making domains. Future research may refine and extend this model by incorporating longitudinal data or testing its applicability in diverse economic sectors.

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Journal of Islamic, Social, Economics and Development (JISED)
eISSN: 0128-1755
Journal website: www.academicinspired.com/jised
DOI: 10.55573/JISED.107649

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