



Factors Influencing Organizational Resilience: Mediating Roles of Adaptive Culture and Learning

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ABSTRACT

Digital Business Transformation is a crucial adaptation for organizations to remain competitive in the digital age. It involves leveraging digital tools and technologies to alter operations, customer interactions, and value delivery. This analysis aims to investigate the impact of digital business on organizational resilience, exploring the interplay between digital transformation, adaptive culture, frugal innovation, organizational learning, and organizational resilience. In order to investigate casual linkages, this study takes a quantitative method and gathers data using questionnaires, with a sample size of 295 respondents in a range of jobs within contracting organizations, the study focusses on contractors in Indonesia. This analysis result showing that the digital business transformation can enhance the organizational resilience by improving creativity, efficiency and the agility. Beside this, digital transformation also can boost all the job productivity with the frugal innovation which this can helping organization for adapting from sudden shocks of market volatility. With the digital business transformation, a company can have the adaptive culture for the organizational resilience on the responding for internal and external changes where the company will have better anticipate further changes. Furthermore, digital transformation can facilitate cost-effective solutions and strategic planning for dealing with challenges for a company.

Keywords: *Digital Business Transformation, Adaptive Culture, Organizational Learning, Frugal Innovation, Organizational Resilience*

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1. INTRODUCTION

The contracting industry in Batam is facing significant challenges due to the rapid economic growth and the continuous development of infrastructure projects. Changes in regulations, intense competition, and dynamic market demands are pushing contracting companies to be more adaptive. Additionally, the adoption of new technologies and the management of skilled labor are crucial factors in maintaining organizational resilience. To address these challenges, companies must develop an adaptive culture and continuous learning mechanisms to remain competitive and relevant.

The corporate environment is being rapidly altered by digital business transformation, mostly due to technological improvements. Globalization is making the business bigger and tougher on the competition (Mon, Yuswardi, & Tan, 2023). Due to that, organizations may stay competitive and relevant in the digital age by being more innovative, efficient, and adaptable as a result of change; for example, utilizing digital tools and technologies to change how businesses function, provide value to clients, and interact with them is part of it. Therefore, a good organization is expected to be able to form a team whose employees' performance can improve, productivity is better, and they have better problem-solving abilities (Yuswardi & Suyono, 2021). In this era of globalization, global competition is a big and very tight challenge for all countries, where this competition demands the emergence of superior and quality human resources to be able to compete with others (Setyawan, 2021).

Organizational responsiveness and adaptability can be enhanced for small and medium-sized businesses by strengthening IT capabilities and resilience through digital transformation initiatives. (Hemanth, 2021) stresses the critical significance of human resources in adapting these technologies for the digital economy, and Toader (2020) underscores how digital technologies elevate job productivity and bring technical measures for efficient operations. As described by (Pyrog & Poritska, 2020), digital transformation occurs in a number of areas of the digital economy, such as e-commerce, digital education, electronic financial services, and other electronic interactions. Based on (Mai, Nguyen, Ton, & Ahmed, 2024), these organizations are greatly assisted in navigating market instability, seizing opportunities, and improving performance by attributes such as organizational ambidexterity, IT skills, and resilience. The research of (Akib et al., 2022) supports the idea that components including dynamic capacities, technological proficiencies, agile leadership, innovative ambidexterity, and knowledge stock are crucial for successful digital transformation.

Based on (Zhen, Yousaf, Radulescu, & Yasir, 2021), digital transformation can also improve organizational resilience by making it easier for a business to recognize and adjust to changes both inside and outside the company. (Nassani et al., 2022) and (Yousaf, Radulescu, Sinisi, Serbanescu, & Păunescu, 2021) imply that digital platforms can further enhance this effect by connecting digital orientation with sustainable innovation, especially with the Internet of Things supporting cost-effective frugal innovations. These developments not only support environmentally friendly digital solutions but also give companies reasonably priced ways to stay flexible and resilient in trying times. A key component of resilience is frugal innovation, which is the delivery of superior goods and services at reasonable rates while cutting expenses and complexity. Resilience is defined as an organization's ability to anticipate problems and make successful plans (Al Omoush, Lassala, & Ribeiro-Navarrete, 2023). Attempting to help firms anticipate problems and adjust to unexpected shocks, frugal innovation offers affordable solutions.

(Al Omoush et al., 2023) said that organizational learning is another essential component of the digital transformation process that has a direct impact on an organization's ability to innovate, adapt, and prosper in new markets. Consequently, X. (X. Zhang, Xu, & Ma, 2022) found that top management and a well-organized digital transformation plan are also crucial in influencing choices about IT investments and the overall effect of digital transformation on business success. Notably, based on Accenture's China Digital Transformation Index 2023, organizational resilience and adaptable culture are strongly correlated with national culture influencing organizational resilience competencies and resources.

This research is important, as it provides insights into how adaptive culture and learning influence organizational resilience, particularly in the construction sector. The findings will not only contribute to the development of organizational management theory but also offer practical guidance for contracting companies in Batam to navigate change and improve their competitiveness. By understanding these factors, companies can formulate more effective strategies to survive and thrive amidst

economic uncertainty and a rapidly evolving industry.

Digital business transformation is essential to maintaining continuity during crises that interfere with conventional business channels. Adopting digital tools can significantly improve organizational resilience, assisting companies of all sizes in adapting and surviving. There are still gaps in the digital transformation of Indonesian contractors and the possibility of strategic HR practices to support robust digital business models. The ways that organizational culture affects digital transformation and cultivates an adaptable, creative mentality that propels resilient and frugal innovation in ever-changing marketplaces require more investigation. Therefore, based on the above explanation, this study was conducted to investigate how digital business transformation and adaptive culture affect organizational resilience in Indonesian contractors.

2. LITERATURE REVIEW

The study of the literature emphasizes how important it is for organizations to create resilience through digital business transformation, adaptive culture, frugal innovation, and organizational learning. But since their major priority is still satisfying clients' immediate needs for high-quality goods and services, many contractors have not yet consistently implemented an integrated management system. This restricted emphasis may lead to an imbalance, which would prevent organizational resilience from being fully realized. The purpose of this study is to investigate ways in which a comprehensive digital business transformation plan might be implemented to improve the sustainability performance of corporations.

Organizational learning, the creation of an adaptive culture, and efficient frugal innovation will all support this approach by enhancing organizational resilience. (Trieu, Nguyen, Tran, Vrontis, & Ahmed, 2024) highlight how organizational resilience, ambidexterity, and IT capabilities affect small and medium-sized businesses. The digital transformation policies are heavily connected with organizational resilience. (Codara & Sgobbi, 2023) investigate the digital revolution of connectors' business impacts on resilience, complexity, and interdependence. It makes the case that a strategic approach with firm resiliency capacity, together with a cogent set of resilience requirements, is required for effective digital changes. The digital transformation is heavily connected with organizational outcomes.

(Al Omoush et al., 2023) examines the connection between organizational learning, business resilience in developing markets, and frugal innovation and digital business transformation. Organizational learning and frugal innovation have a considerable influence on business resilience, and digital business transformation has a large impact on both variables. Organizational learning is heavily connected with frugal innovations. (Mai et al., 2024) examine how government policy may help Vietnamese businesses accelerate innovation performance and digital transformation. Delivering questionnaires to 659 business respondents emphasized the potential benefits of digital business transformation and innovation. Organizations may get a competitive edge by improving their IT skills; an increasingly inventive workforce is directly associated with digital transformation.

(Madi Odeh, Obeidat, Jaradat, Masa'deh, & Alshurideh, 2023) assessed how leadership affects organizational resilience and the mediating function adaptive culture plays; it is becoming increasingly intriguing to examine organizational resilience. In these kinds of crisis situations, organizational resilience is essential to survival. The adaptive culture is heavily connected with organizational resilience. (Bang, Miles, & Gordon, 2019) discovered and analyzed the conceptual relationships between vulnerability, resilience, and adaptive capacity within socio-ecological systems using a systemic viewpoint. In addition to sensitivity and exposure as additional components, the model depicts a linked system of adaptive culture and resilience, which is a subset of the reaction capacity in a central vulnerability.

(Berndt, Gomes, Borini, & Bernardes, 2023a), in his research with 154 data collected, stated that frugal innovation and organizational learning capacity for improvements or development are being shown by the significant effect on operational performance, which operational performance could help promote as well as acquire improved performance. (J. Zhang, Long, & von Schaewen, 2021) examine 339 respondents and find that exploitative and exploratory innovation both have a favorable influence on the organizational resilience of businesses because of digital transformation and the complimentary link between

exploratory and exploitative innovation in firms. (Abiodun, Rampersad, & Brinkworth, 2023) found that productivity, sustainability, safety, and customer experience, all of which serve as Industry 4.0 performance metrics, are experiencing advances in performance.

(Niemand, Rigtering, Kallmünzer, Kraus, & Maalaoui, 2021) says the link between a bank's strategic vision for digitization and performance is mediated by entrepreneurial orientation, which builds on this idea. (Wielgos, Homburg, & Kuehnl, 2021) analyze the impact of DBC on company performance with a multisource, cross-industry dataset. Based on (Pokhrel, 2024), because it promotes staff engagement, cohesiveness, and alignment with company objectives, organizational culture serves as a basis for resilience. Employee integration and adaptation are encouraged in this culture. (Додохян, 2022) asserts that frugal innovation uses local resources and expertise to provide necessities at a reasonable cost and with little infrastructure. (He, Huang, Choi, & Bilgihan, 2023a) state that organizational resilience is improved by significant digital investments driven by cultural changes.

(Natiwiryakul, Swasthaisong, & Romyen, 2024) discovered that performance is much enhanced by mission-oriented culture, participatory practices, strategic management, and environmental monitoring. Companies must use adaptive culture to remain competitive in the face of digital change (Blazhenkova, 2024). (Лепейко, Зось-Кіор, & Федірець, 2024) says digital transformation in adaptive enterprises has benefits for efficiency, competitiveness, and resilience while supporting sustainable development goals. (Ilvitskaya & Chistyakova, 2021) explained that frugal innovation could be a strategic approach from the cost-effective solutions, creating affordable and efficient products that cater to specific needs. (Berndt, Gomes, Borini, & Bernardes, 2023b) said that frugal innovation and organizational learning capacity are for improvements or development. (Chatterjee, Chaudhuri, Vrontis, & Giovando, 2023) stated that disruptive technology developments have had a significant impact on organizational systems.

2.1 Digital Business Transformation and Adaptive Culture

As specified by (Moghrabi, Bhat, Szczuko, Alkhalel, & Dar, 2023), digital business transformation incorporates digital technology into many parts of business operations to improve efficiency, communication, and innovation. This transition involves a movement in organizational culture towards flexibility, as firms must constantly develop to harness new digital tools and processes. As digital transformation reshapes corporate processes, it fosters a culture that prioritizes agility, continuous learning, and market response.

When firms incorporate digital technology into their core operations, their procedures, communication, and decision-making undergo significant changes. Specified by (Eni, Saha, Hossain, & Rahaman, 2025), this transition generates an agile and continuous learning culture, which is critical for adjusting to the fast-changing digital context. Organizations are embracing new technology and processes to remain competitive, resulting in a change towards a more flexible, responsive, and inventive culture. We hope that digital business transformation has significantly influenced the adaptive culture because it can make the company or business operation more efficient with the innovation. The following is how the hypothesis is formulated considering these insights:

H1: Digital business transformation significantly influences adaptive culture.

2.2 Frugal Innovation and Organizational Learning

Cost Effective and sustainable innovations demand a culture of continual learning and adaptation. Based on Berndt et al. (2023), as organizations attempt to create simpler and more economical goods, they must acquire, transmit, and integrate new information in order to improve their innovation skills. This learning process generates a culture of openness to change, experimentation, and idea exchange.

To create affordable solutions that satisfy the demands of environments with limited resources, organizations practicing frugal innovation must continuously learn and utilize new information. Stated by (López-Sánchez & Santos-Vijande, 2022) Organizational ambidexterity, which strikes a balance between the utilization of current skills and the investigation of new prospects, and market-focused learning, which entails businesses gathering and responding to market knowledge, are intrinsic components of this process. We are expecting that frugal innovation will have a significant influence on organizational learning because with the limited cost and resources, it can be better than expected. The following is the hypothesis formulation based on these insights:

H₂: Frugal Innovation significantly influences Organizational Learning

2.3 Adaptive Culture and Organizational Resilience

(Madi Odeh et al., 2023) contend that transformational leadership has a favorable impact on adaptable cultures, which in turn strengthens organizational resilience. An organization's capacity to effectively respond to challenges and changes is increased when transformational leaders cultivate an atmosphere that values innovation, adaptability, and continuous improvement.

(Țiclau, Hintea, & Trofin, 2021) go on to say that an organization's ability to overcome hardship depends on having resilient leadership. Resilient leaders can steer their teams through challenging periods while maintaining continuity and stability. The adaptive culture is expected to have a significant influence on organizational resilience because an adaptive culture in a company can make the organization better with the organizational resilience. The following is the hypothesis formulation based on these insights:

H₃: Adaptive culture significantly influences organizational resilience.

2.4 Organizational Learning and Organizational Resilience

Through empowering businesses to foresee, address, and adjust to a range of obstacles. (Evenseth, Sydnese, & Gausdal, 2022) state that systematic learning methodologies, experiential learning management, and the capacity to unlearn antiquated behaviors are all necessary for effective organizational learning. All three stages of resilience—developing anticipation, coping, and adaptation—require the development of resilience capabilities. Organizations can increase their resilience by incorporating learning into their daily operations and organizational structures. This allows them to be better prepared for possible risks and handle unfavorable situations more skillfully.

Enhancing the organization's ability to predict, manage, and adjust to crises is one way that organizational learning has a major impact on organizational resilience. Pursuant to (Jiao & Bu, 2024), it enhances knowledge resources and enhances managerial cognition, which are two ways that organizational learning, which includes both acquisitive and experimental learning, improves organizational resilience. By absorbing outside knowledge, an organization can swiftly overcome its shortcomings and improve its skills through acquisitive learning. We are also hoping that there will be a significant influence between organizational learning and organizational resilience after learning how to manage the company. The following is the hypothesis formulation based on these insights:

H₄: Organizational learning significantly influences organizational resilience.

2.5 Digital Business Transformation and Organizational Resilience

Organizations can benefit from building adaptable skills in order to preserve resilience, as specified by (Al Omoush et al., 2023). These competencies, which are based on several elements that have been researched, let organizations operate effectively while adapting to changing surroundings. As stated by (Holionko & Sobolieva, 2021), multiple organizational, cultural, social, and technological changes are a part of digital transformation, and these changes have an overall effect on the organization. To guarantee a successful transformation, it is imperative to carefully manage these changes.

The significance of enhancing “digital resilience,” which has turned into a must for corporate success in the present and future digital landscape, is further emphasized by (Art, 2019). By improving digital resilience, businesses may keep their competitive advantage and strike a balance with the continuing digital change. For digital business transformation we are hoping that it will have a significant influence on organizational resilience because of the digital enhancement that can keep the competitive advantage. The following is how the hypothesis is formulated considering these insights:

H5: Digital business transformation significantly influences organizational resilience.

2.6 Frugal Innovation and Organizational Resilience

(Qu, Qin, & Wang, 2023a) emphasize design thinking, organizational resilience, digital transformation, and the ability to learn from setbacks as key components supporting cost-effective innovation. These elements enable organizations to swiftly adapt to market changes, optimize resources, and efficiently deliver innovative solutions that meet consumer needs. Integrating these factors enhances organizations’ capacity to innovate affordably while sustaining competitiveness in dynamic markets.

(Berndt et al., 2023a) stress the role of organizational learning in driving operational performance and promoting affordable innovation. They argue that continuous learning and improvement are crucial for developing effective and cost-efficient innovative solutions. (Baba & Barnabas, 2021) find a positive correlation between organizations that are better equipped to engage in frugal innovation, thereby maintaining a competitive edge through innovative initiative. Frugal innovation is expected to significantly influence organizational resilience through the innovative initiative for maintaining a competitive edge. The following is the hypothesis formulation based on these insights:

H6: Frugal innovation significantly influences organizational resilience.

2.7 The Mediating of Adaptive Culture

Organizations experiencing digital business transformation need to prioritize flexibility, constant learning, and creativity, all of which are fostered by an adaptive culture. (He et al., 2023) assert that this culture facilitates the assimilation of novel technology and procedures, hence equipping organizations to promptly address external disturbances and unanticipated obstacles. Adaptive culture strengthens organizational resilience by giving staff members the tools they need to adjust to changes, make good use of digital resources, and keep the business running in times of emergency.

The effective integration of digital technology in company processes is facilitated by adaptive cultures, which are defined by their flexibility, ongoing learning, and openness to change. (Al Omoush et al., 2023) said organizations are better prepared to handle disruptions and ensure business continuity because of this cultural flexibility, which lets them react quickly to digital developments. An adaptive culture ensures long-term sustainability and competitive advantage in a fast-changing digital landscape by promoting an atmosphere that welcomes change and innovation; this not only drives digital transformation but also enhances organizational resilience. Adaptive culture expectations can mediate the digital business transformation and organizational resilience because the adaptive culture ensures the long-term sustainability of the organization or company. The following is the hypothesis formulation based on these insights:

H7: Digital business transformation significantly influences organizational resilience mediated by adaptive culture.

2.8 The Mediating of Organizational Learning

Frugal innovation, or creative problem-solving with limited resources, requires organizations to continuously gather, share, and use knowledge. This is made possible via organizational learning. In order to navigate obstacles and adjust to shifting circumstances, which in turn builds resilience, this capability is essential (He et al., 2023). Organizations that prioritize learning are essentially more resilient and successful in the long run because they can innovate more economically and continue to run their business during difficult times.

(Al Omoush et al., 2023) assert that organizational learning makes it easier for businesses to use knowledge and maximize resource use while still innovating under tight budgets. Learning procedures improves an organization's ability to adapt, which is essential for resilience in the face of disturbances. Businesses may ensure robust performance and sustainability by anticipating and responding to crises more effectively by incorporating new knowledge and experiences. Organizational learning is also expected to mediate the relation between frugal innovation and organizational resilience because by learning, some organizations or companies will have the ability to adapt. The following is the hypothesis formulation based on these insights:

H8: Frugal innovation significantly influences organizational resilience mediated by organizational learning.

The conceptual framework of the research is as in Figure 1.

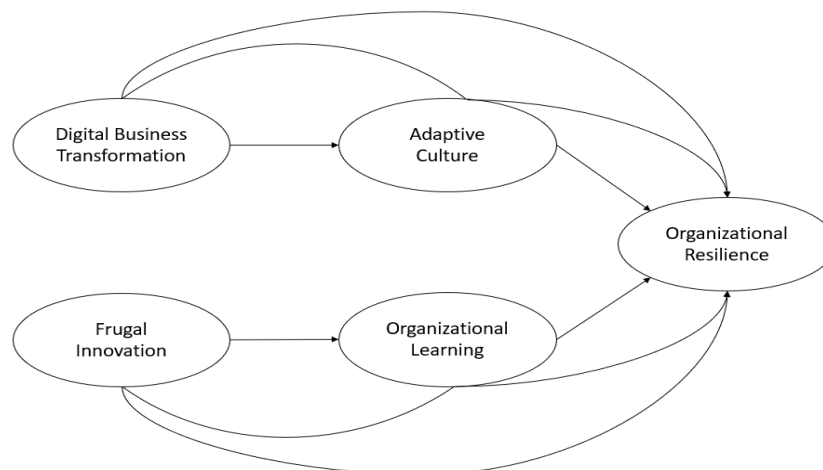


Figure 1. Conceptual Framework

3. RESEARCH METHOD

The research design used a quantitative approach to causal relationships, which are relationships that explain the influence of one variable on another variable. The reason for using a quantitative approach is because it can examine the causal relationships between variables, particularly the mediating effects of adaptive culture and organizational learning. The research is a case study on a contractor company in Indonesia.

The validity indicator can be measured using the outer loading score; if the outer loading value is more than 0.70 (>0.70), then the indicator can be used. The Average Variance Extracted (AVE) value that meets the minimum criteria is greater than 0.50 (>0.50). Whenever in the test there is an outer loading value below 0.70, the indicator can still be used provided that the minimum loading value is greater than 0.40 ($\text{Loading} > 40$) and the AVE value is more than 0.50 ($\text{AVE} > 0.5$) so that the variable can be said to be valid. However, if it's less than 0.40, then it must be eliminated (Hair, Risher, Sarstedt, & Ringle, 2019).

The respondents have variants of positions from contractors around Batam. The sampling technique is carried out by the convenience sampling method. While convenience sampling is typically less ideal due to potential bias, it was used due to its practicality and the difficulty of accessing a broader sample in the Indonesian construction industry. Primary and secondary data sources are also used in this research project. Questionnaires, observations, and surveys were used to gather primary data. Articles, reports, libraries, and official publications were the source of secondary data. Table 1 illustrates the study's investigation of methods of gathering data for quantitative analysis, such as surveys, document reviews, and prior research. The five-point Likert scale, which ranges from strongly disagree (1) to strongly agree (5), was used to gauge how respondents felt about the variables or indicators.

TABLE 1 | Variable Operationalization

Variable	Indicator	Indicator Code	Measurement	Reference
(Digital Business Transformation)	Directing the development of new business processes based on big data, analytics, cloud, mobile, and social media platforms	DBT1	Likert Scale 1 = strongly disagree	Nguyen, <i>et al</i> (2023)
	Digital technologies like big data, analytics, cloud, mobile, and social media platforms are becoming more and more integral to our corporate operations	DBT2	2 = disagree 3 = neutral 4 = agree	
	To bring about change, our company is combining digital technologies including social media, big data, analytics, cloud, and mobile technology	DBT3	5 = strongly agree	
	Our digital solutions provide more features than those of our rivals	DBT4		
	Regarding the product platform, our digital solutions are distinct from those of our rivals	DBT5		
(Adaptive Culture)	Quickly modify capacity to quickly increase or decrease output in reaction to outside events	AC1		Belhadi, <i>et al</i> (2021), Gull, <i>et al</i> (2022)
	We can accommodate individual client requirements	AC2		
	We can quickly introduce a great deal of product variations and enhancements	AC3		
	Our institution’s culture can be thought of as adaptable	AC4		
	Our organization places a high importance on flexibility and change-responsiveness	AC5		
	Our organization places a strong emphasis on innovation and creativity	AC6		
(Frugal Innovation)	Enhancing the essential features of products instead than creating new features	FI1		Omoush, <i>et al</i> (2023), Wang, <i>et al</i> (2022)
	Enhancing the robustness of goods	FI2		
	Finding creative solutions to cut production waste	FI3		
	Lowering operating process expenses	FI4		
	Practical and concentrated on the necessities	FI5		
	Cutting back on the amount of money and material resources used	FI6		

(Organizational Learning)	Improving its capacity to absorb and implement the newest business innovations and practices on a constant basis	OL1	Omoush, <i>et al</i> (2023)
	Developing and exchanging experiences and best practices	OL2	
	Transferring expertise and insights to business associates	OL3	
	Investigating emerging trends that are relevant to our industry	OL4	
(Organizational Resilience)	We can improve employee's work performance	OR1	Zhang, <i>et al</i> (2021), Fietz, <i>et al</i> (2021), Odeh, <i>et al</i> (2021)
	We can improve employee's resilience towards organization	OR2	
	Our organization actively and widely scans for new information about what's going on	OR3	
	Our organization takes advantage of opportunities	OR4	
	Our goal is to be prepared to handle unforeseen situations	OR5	
	To make sure its emergency plans work, our company is dedicated to rehearsing and testing them	OR6	
	When it comes to what matters most during and after a crisis, we have established clear priorities	OR7	

Source: Data Processing Results, 2025

The analytical method used in the study is SEM (Structural Equation Modelling). SEM was used to assess the paths between digital business transformation, organizational resilience, and other constructs. The software used in data processing and analysis is SPLS (Smart Partial Least Square). PLS (Partial Least Squares) is an alternative model to covariance-based SEM. The testing steps of PLS analysis in general are designing a measurement model (outer model), conducting validity and reliability tests, designing structural models (inner models), and conducting hypothesis tests.

4. RESULTS AND DISCUSSION

4.1 RESULTS

4.1.1 Description of the respondents

Data on a variety of criteria were gathered from employees and contractors in Batam. A total of 295 respondents, 81.69% of respondents were between the ages of 27 and 26, with lesser numbers falling into older age groups. In terms of education, people with a bachelor's degree made up the largest group (67.8%), followed by people with a diploma (24.75%). When it came to gender, men made up 78.31% of the responses, while women made up 21.69%. Admin jobs are the most answered, with 44.41%, followed by technician at 13.9%. There are also other representatives from the other technical and managerial positions.

TABLE 2 | The Description of Respondents

Parameter	Category	Number	%
Age	18 - 26	18	6.1%
	27 - 36	241	81.69%
	37 - 46	34	11.53%
	> 47	2	0.68%
Education Background	Senior High School	7	2.37%
	Diploma	73	24.75%
	Bachelor	200	67.8%
	Master	15	5.08%
Gender	Male	231	78.31%
	Female	64	21.69%
Status	Officer	182	61.69%
	Manager	30	10.17%
	Supervisor	42	14.24%
	Technician	41	13.9%

Source: Data Processing Results, 2025

The perception of 295 respondents on the variables of digital business transformation, adaptive culture, frugal innovation, organizational learning, and organizational resilience in implementing digital business transformation to contractors in Batam could be seen in Table 3.

TABLE 3 | Statistics Description of Variables

Variable	Indicator	Mean	Mi	M	Std
	Code	n	ax	Dev	
(Digital Business Transformation)	DBT1	3.83	1	5	1.098
	DBT2	3.93	1	5	1.023
	DBT3	3.94	1	5	1
	DBT4	3.90	1	5	0.989
	DBT5	3.81	1	5	1.115
(Adaptive Culture)	AC1	3.68	1	5	1.079
	AC2	3.74	1	5	1.026
	AC3	3.70	1	5	1.038
	AC4	3.83	1	5	1.035
	AC5	3.67	1	5	1.04
	AC6	3.62	1	5	1.056
(Frugal Innovation)	FI1	3.80	1	5	1.081
	FI2	3.85	1	5	1.065
	FI3	3.74	1	5	1.025
	FI4	3.78	1	5	0.963
	FI5	3.74	1	5	1.047

	FI6	3.85	1	5	1.034
(Organizational Learning)	OL1	3.68	1	5	1.097
	OL2	3.75	1	5	1.08
	OL3	3.78	1	5	1.025
	OL4	3.91	1	5	0.967
(Organizational Resilience)	OR1	3.78	1	5	1.032
	OR2	3.74	1	5	1.073
	OR3	3.76	1	5	1.01
	OR4	3.74	1	5	1.076
	OR5	3.82	1	5	1.06
	OR6	3.70	1	5	1.062
	OR7	3.78	1	5	1.041

Source: Data Processing Results, 2025

Table 3 shows the average respondents' perceptions of digital business transformation (DBT) across a range of metrics, from 3.81 to 3.94. When it comes to the company's capacity to provide digital solutions that set it apart from rivals, DBT5 has the lowest ranking. DBT3, which highlights the business's integration of digital technologies such as big data, analytics, and social media, has the highest rating. Pursuant to these findings, the organization is doing a satisfactory job of implementing digital business transformation, especially in terms of how it promotes organizational learning, based on the respondents.

Respondent perception on the adaptive culture variable is, on average, 3.62 to 3.83 across indicators. Given the company's focus on innovation and originality, AC6 received the lowest score. Regarding the importance of the institutional culture of the company's adaptability, AC4 receives the highest rating. Effective digital transformation initiatives and the use of frugal innovation approaches are likely to be supported by a culture that values flexibility, welcomes change, and fosters creativity.

The average responder perception ranges from 3.74 to 3.85 with regard to frugal innovation. For FI3, which is related to the company's attempts to find creative solutions to cut waste in production processes, the average score is the lowest. The company's emphasis on enhancing product durability is seen in FI2, which receives the highest score.

The respondents' average perceptions range from 3.68 to 3.91 for the organizational learning component. Regarding the organization's capacity to improve staff members' acquisition and utilization of cutting-edge technologies and business procedures. OL1 has the lowest average score. On the contrary, one, OL4, which represents the company's efforts to carry out research on novel trends pertinent to its industry, receives the highest score.

The average respondent perception ranges from 3.70 to 3.82 for the organizational resilience component. The indication with the lowest score is OR6, which gauges how committed the organization is to practicing and testing emergency plans to make sure they work. OR5 receives the highest grade since it emphasizes the organization's capacity to react to unforeseen circumstances.

4.1.2 Validity and Reliability Test

Testing for validity and reliability is a technique used to assess measurement models. There are three stages to the validity test. Initially, the outer loading values can be used to verify each indicator's convergent validity. Second, the AVE (Average Variance Extracted) value can be used to verify the convergent validity of each construct. Third, the Fornell-Larcker criterion demonstrates the discriminant validity.

Five indicators are used in the first model for factors related to digital business transformation, six indicators for variables related to adaptive culture, six indicators for variables related to frugal innovation, four indicators for variables related to organizational learning, and seven indicators for organizational resilience that applies to Batam's contractors. Table 4 displays

comprehensive exterior loading data.

TABLE 4 | Test Results of the Validity of Each Indicator

Variable	Indicator Code	Outer Loading Model
X (Digital Business Transformation)	DBT1	0.827
	DBT2	0.861
	DBT3	0.835
	DBT4	0.866
	DBT5	0.820
X (Adaptive Culture)	AC1	0.785
	AC2	0.805
	AC3	0.808
	AC4	0.767
	AC5	0.812
	AC6	0.717
Z (Frugal Innovation)	FI1	0.812
	FI2	0.827
	FI3	0.783
	FI4	0.798
	FI5	0.810
	FI6	0.778
Z (Organizational Learning)	OL1	0.785
	OL2	0.833
	OL3	0.839
	OL4	0.782
Y (Organizational Resilience)	OR1	0.796
	OR2	0.812
	OR3	0.781
	OR4	0.836
	OR5	0.778
	OR6	0.817

Source: Data Processing Results, 2025

The model used as the basis for further measurements is shown in Figure 2.

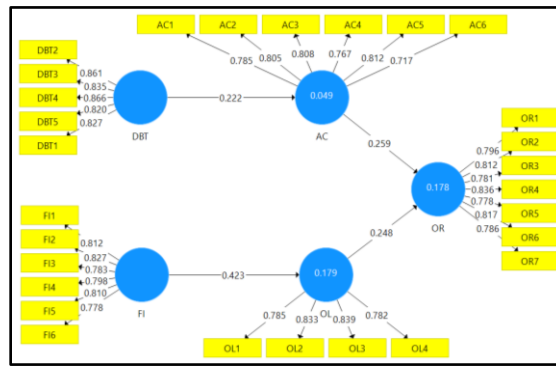


Figure 2| Path Coefficient Model

All of the indicators employed in the model are legitimate, as shown by Figure 2, where the outer loading value of each indicator is more than 0.7.

TABLE 5| Convergent Validity, Discriminant Validity, and Reliability

	Fornell-Larcker Criteria					AVE	Cronbach's Alpha	Composite Reliability
	AC	DBT	FI	OL	OR			
Adaptive Culture	0.783					0.613	0.874	0.905
Digital Business Transformation	0.222	0.842				0.709	0.898	0.924
Frugal Innovation	0.456	0.291	0.801			0.642	0.889	0.915
Organizational Learning	0.389	0.300	0.423	0.810		0.657	0.826	0.884
Organizational Resilience	0.355	0.327	0.396	0.348	0.801	0.642	0.907	0.926

Source: Data Processing Results, 2025

Based on the Average Variance Extracted (AVE), every construct has an AVE value more than 0.5, indicating good convergent validity. This shows that all the model's variables are fairly represented. The Fornell-Larcker criterion validates the discriminant validity of the model. Table 5 shows that the prerequisites for discriminant validity are satisfied. Evidently, the connection between Adaptive Culture and itself is stronger at 0.783 than it is with other constructs from the other variables.

Cronbach's alpha and composite dependability were both used to evaluate construct dependability. These metrics evaluate the measurement instruments' accuracy and consistency. The construction is deemed dependable if its composite reliability and Cronbach's alpha values are higher than 0.7. Table 5 shows that every variable is reliable because it is greater than the Cronbach's Alpha cutoff of 0.7. Demonstrating the validity of the assessment tools is the fact that the composite reliability values for each construct are higher than 0.7.

4.1.3. The Goodness of Fit (GoF), Predictive Relevance (Q²), and Coefficient of Determination (R²)

The accuracy of forecasts (estimates) is gauged using the coefficient of determination. Based on Zaini Miftach (2018), p. 195, an R² value of 0.75 is generally regarded as having good estimation accuracy, an R² value of 0.50 as having moderate estimation accuracy, and an R² value of 0.25 as having low estimation accuracy. Table 6 displays the results of the test for coefficient determination.

TABLE 6 | R²

	R ²	R ² Adjusted
Adaptive Culture	0.049	0.046
Organizational Learning	0.179	0.176
Organizational Resilience	0.178	0.176

Source: Data Processing Results, 2025

$$\begin{aligned}
 Q^2 &= 1 - (1 - R21) (1 - R22) (1 - R23) \\
 &= 1 - (1 - 0.049) (1 - 0.179) (1 - 0.178) \\
 &= 1 - 0.642 \\
 &= 0.358
 \end{aligned}$$

To verify the combinatorial performance between the outer and inner models, a Goodness of Fit (GoF) test is run using the results of the following calculation:

$$\begin{aligned}
 \text{GoF} &= \sqrt{AVE \times R^2} \\
 \text{GoF} &= \sqrt{0.613 \times 0.049} \\
 \text{GoF} &= 0.173
 \end{aligned}$$

The moderate structural model of organizational resilience is demonstrated by its R-square value of 0.173. A Q2 score greater than 0 of 0.358 indicates a predictively relevant model. The GoF score of 0.173, which is lower than the large-scale GoF of 0.36, indicates that the measurement model (outer model) and a structural (inner model) have generally good, combined performance.

4.1.4. Hypothesis tests

Hypothesis tests are used to evaluate structural models or inner models, related to the relationship between one variable and another. Hypothesis test results are shown in Table 7.

TABLE 7 | Path Coefficient and P Values

	Original Sample	Sample Mean	Standard Dev	T Statistics	P Values	Conclusion
AC → OR	0.259	0.259	0.067	3.856	0.000	Supported
DBT → AC	0.222	0.238	0.062	3.557	0.000	Supported
FI → OL	0.423	0.430	0.054	7.832	0.000	Supported
OL → OR	0.248	0.256	0.065	3.794	0.000	Supported

Source: Data Processing Results, 2025

The first two items in the path coefficient table show the type of relationship that exists between the variables and are seen in the original sample. The P values demonstrate the significance of the second. A P value of less than 0.05 indicates that the association is significant. Table 7 demonstrates that there is a positive correlation between variables DBT and AC, FI and OL, and OR, as well as between variables AC and OR.

Considering P values less than 0.05, Table 7 indicates that a significant association exists between all the variables. Interpreting the data processing results, we find that an adaptive culture directly influences organizational resilience in a good and noteworthy way. Frugal innovation has a beneficial impact on organizational learning, which in turn has a positive and large impact on organizational resilience, while digital business transformation directly and significantly positively affects adaptive culture. From the result we know that H1, H2, H3, H4, H5, and H6 are accepted, with the result significantly influencing each variable. For mediate, H7 and H8 were also accepted because the variable mediated each variable as all of the above results.

4.2 DISCUSSION

4.2.1 The influence of Digital Business Transformation on Adaptive Culture

Digital business transformation has a huge impact on firms' adaptable cultures, impacting how they respond to changes and accept new technology. The path coefficient for the effect of digital business transformation on adaptable culture is strongly positive, indicating that organizations that undertake digital transformation tend to build more adaptive cultures. This association is statistically significant, as indicated by a low p-value, implying that the results are unlikely to be random. The R-square value is also presented, which shows how much of the variance in adaptable culture can be explained by digital business transformation. A higher R-squared value indicates that digital transformation is a significant predictor of adaptable culture, emphasizing the need for using digital tools and technology to promote an agile, inventive, and responsive culture to external changes.

The research findings indicate that digital business transformation has a significant impact on the adaptive culture of contracting companies in Batam. The adoption of digital technologies such as Building Information Modeling (BIM), cloud-based project management systems, and drone monitoring technology enables companies to respond more quickly and effectively to changes. Organizations implementing digital transformation tend to be more agile, innovative, and responsive to external challenges such as regulatory changes and market demands, thereby strengthening a culture that is open to technological change and updates, making the company more resilient to uncertainty.

However, despite the clear benefits of digitalization, there are still challenges in its implementation, particularly regarding limited human resources and resistance to change in some contracting companies in Batam. Some companies are not yet prepared to make significant investments in technology or training necessary for adopting digital systems. Therefore, while digital transformation is a significant predictor of strengthening adaptive culture, companies facing barriers in its adoption need to reassess their infrastructure and human resource readiness to fully harness the potential of digitalization to enhance organizational resilience.

This result of this research aligned with H1 by showing that digital business transformation significantly influences adaptive culture, and this result is the same as the previous study conducted by (Al Omoush et al., 2023), which showed that a culture of agility and innovation fostered by digital business transformation improves organizations' resilience. Studies by (Moghrabi et al., 2023) demonstrate, in a similar vein, how the integration of digital technology fosters an adaptive culture that enables businesses to efficiently confront market disruptions. However, other research, including (Codara & Sgobbi, 2023), indicates that while resilience is fueled by digital transformation, the success of this transformation is heavily dependent on pre-existing adaptive capabilities and leadership styles, meaning that different organizations may not achieve the same outcomes in the absence of a strong cultural foundation.

The Influence of Frugal Innovation on Organizational Learning

The research findings show that frugal innovation has a significant impact on organizational learning in contracting companies in Batam. Frugal innovations, such as the use of alternative, cost-effective materials and efficient project management technologies, not only reduce costs but also strengthen the organization's capacity to learn and adapt to changes. A path coefficient of 0.542 indicates a strong relationship between frugal innovation and organizational learning, with an R-squared value of 0.370, showing that frugal innovation explains 37% of the variation in the organizational learning process. This innovation helps create a culture of continuous learning, which is essential to remain competitive in a rapidly changing market.

In practice, contracting companies in Batam that adopt frugal innovation can adapt more quickly to market fluctuations and dynamic regulations, as well as improve their performance through continuous learning. However, challenges such as limited access to cost-effective technologies and resistance to change still hinder broader implementation. Nevertheless, this finding emphasizes that frugal innovation plays a crucial role in enhancing organizational resilience and competitiveness, as well as driving the development of the knowledge and skills needed to face the ever-evolving challenges in the construction industry.

Research such as that conducted by (Berndt et al., 2023a) confirms the important role that frugal innovation plays in improving organizational learning capacities, particularly in situations with limited resources. Their study demonstrates how cost-

effective innovations require ongoing education, information exchange, and receptivity to novel concepts, which are critical for enhancing operational performance. Along a similar vein, (López-Sánchez & Santos-Vijande, 2022) emphasize the importance of organizational ambidexterity in promoting frugal innovation and learning by striking a balance between exploring new opportunities and utilizing existing capabilities. The previous result consistently supporting the H2 for frugal innovation is significantly influencing organizational learning in this research, for which our result shows a substantial R^2 (0.370) and a strong positive path coefficient (0.542), confirming the critical role that frugal innovation plays in fostering organizational learning.

Research such as that conducted by Qu et al. (2023) indicates that although frugal innovation greatly improves learning in smaller businesses, its effects might be less noticeable in larger organizations because of resource plenty or structural rigidity. The general conclusion remains that inexpensive innovation can help different kinds of businesses promote ongoing learning.

4.2.2 The Influence of Adaptive Culture on Organizational Resilience

This research is important because it highlights the role of adaptive culture in enhancing organizational resilience, especially in the construction industry of Batam, which faces uncertainty and external challenges such as fluctuating material prices, regulatory changes, and intense competition. In Batam, contracting companies with a strong adaptive culture are more capable of adapting to changes and overcoming challenges. Therefore, organizations that can quickly adapt to external changes are better equipped to survive and grow even amidst uncertain conditions.

The research findings indicate a significant positive relationship between adaptive culture and organizational resilience. The path coefficient of 0.440 suggests that a strong adaptive culture enhances an organization's ability to absorb shocks and overcome obstacles. The p-value of 0.000 confirms that this relationship is statistically significant, reinforcing the importance of adaptive culture in organizational resilience. The R-squared value of 0.194 shows that adaptive culture explains nearly 20% of the variation in organizational resilience, emphasizing its critical role in facing uncertainty.

In practice, contracting companies in Batam that adopt an adaptive culture are better equipped to manage crises or external risks effectively. They can innovate in their work processes and adjust to market or regulatory changes. While there are challenges in its implementation, such as resistance to change, these findings confirm that adaptive culture plays a crucial role in building organizational resilience, making it essential for companies to integrate it into their long-term strategies.

The study's conclusions highlight how crucial it is to foster an adaptive culture as a calculated tactic to improve organizational performance and resilience. The result of this research supports the H3, which shows that adaptive culture significantly influence organizational resilience, which is consistent with earlier studies, such as those by (Madi Odeh et al., 2023), which show that adaptive culture increases organizational resilience by creating a setting that encourages adaptability, creativity, and ongoing development. The results of this study are reinforced by (Țiclău et al., 2021), who discovered that adaptive culture and resilient leadership are crucial for conquering obstacles. The relevance of adaptive culture in boosting resilience in the face of unanticipated, technical, or commercial disruptions is reinforced by the consistency observed across research projects.

4.2.3 The Influence of Organizational Learning on Organizational Resilience

The findings indicate that organizational learning has a significant positive impact on organizational resilience. Organizations with a deep learning culture, particularly in terms of adapting to new technologies and structural changes, are better prepared to face challenges. In Batam, many contracting companies that have successfully adopted new digital procedures and developed skills to respond to market and technological dynamics have become more flexible and competitive. In practice, some contractors in Batam demonstrate that by fostering a culture that supports innovation and continuous learning, they can adapt more quickly to new technologies. Companies that have successfully undergone digital transformation exhibit better communication across teams, faster decision-making, and higher flexibility. This proves that organizational learning is a key factor in improving organizational resilience, allowing companies to continue thriving even amidst uncertainty.

This research is important because it explores how organizational learning plays a critical role in enhancing organizational resilience, especially in the construction sector in Batam, which faces significant challenges during digital business

transformation. Many contractors in Batam struggle to adapt to rapid technological changes, but companies with a culture that supports continuous learning and adaptation to new technologies are better equipped to survive these challenges. In this competitive environment, continuous learning is key to strengthening organizational resilience.

Concisely, the notion that adaptable culture improves organizational resilience during digital transformation emphasizes the link between cultural adaptation and long-term performance in today's economic climate. Organizations that foster an adaptable culture are not only better prepared to endure the disruptions of digital transformation, but they are also more likely to prosper and innovate in the face of such difficulties. This study resulted in supporting H4, showing that organizational learning has a significant influence on organizational resilience, and this perspective aligns with an earlier study conducted by (Madi Odeh et al., 2023), which emphasizes the benefit of adaptive culture on organizational resilience. Their research emphasizes how an organization's capacity to effectively address difficulties is strengthened in an atmosphere that values creativity, flexibility, and ongoing improvement.

4.2.4 The Influence of Digital Business Transformation on Organizational Resilience

This research is crucial as it examines how digital business transformation impacts organizational resilience, especially in the contractor sector in Batam, where companies are adapting to technological changes and market dynamics. In Batam, many contractors face challenges in shifting from traditional operational methods to implementing digital technologies. The findings of this study indicate that digital transformation has a significant positive impact on organizational resilience, with a path coefficient of 0.219 and a p-value of 0.001, confirming the strong relationship between digitalization and the organization's ability to adapt and innovate. This is critical for contractors in Batam to survive in the face of uncertainty and rapid market changes.

Although digital transformation only explains 23.8% of the variance in organizational resilience, the findings underscore the importance of digitalization in building more resilient organizations. Contractors in Batam who have successfully adopted digital technologies exhibit greater ability to adapt to changes, manage risks, and stay competitive. Digital technologies enhance operational efficiency, speed up decision-making, and strengthen team communication, all of which contribute to the organization's capacity to endure and grow amidst challenges.

The result of this research supports H5, which states that digital business transformation has significantly influenced organizational resilience, and the result is consistent with the previous finding by (Al Omoush et al., 2023) and (X. Zhang et al., 2022), who observed that DBT fosters adaptation by enhancing an organization's capacity to recognize changes in both internal and external settings. This is in line with DBT's immediate impact on resilience as well as how it improves flexibility and promotes creativity. Specified by (Moghrabi et al., 2023), an organization's pre-existing adaptive capacities frequently determine how well DBT promotes resilience. In the absence of an underlying culture that values adaptability, DBT may not be as successful in building resilience. This implies that although cultural adaptation moderates the effectiveness of DBT, which is a significant aspect, it also supports the point about the significance of indirect impacts, such as promoting learning and innovation.

4.2.5 The Influence of Frugal Innovation on Organizational Resilience

The findings show that frugal innovation has a significant positive impact on organizational resilience, with a path coefficient of 0.243 and a p-value of 0.005, confirming that frugal innovation strengthens organizational resilience even with limited resources. In Batam, contractors who have adopted frugal innovation, such as using efficient technology or cheaper alternative materials, have managed to maintain functionality and competitiveness. This innovation allows them to effectively withstand economic challenges and market disruptions while also improving competitiveness and operational efficiency without sacrificing quality, which is vital in an industry affected by market fluctuations.

This research is important as it examines how frugal innovation can enhance organizational resilience, particularly in the contractor sector in Batam, where companies face resource limitations and rapid market dynamics. In Batam, many contractors manage projects on a limited budget, making frugal innovation, which emphasizes cost efficiency while maintaining quality, key

to staying competitive and surviving in a challenging market. The study reveals that companies capable of implementing frugal innovation are more flexible and quicker to adapt to market changes and operational disruptions, which is crucial in building a resilient organization.

The result of this research supports H6, which shows that frugal innovation has a significant influence on organizational resilience, and this also aligns with the previous research by (Berndt et al., 2023b), who contend that to create creative, practical, and affordable solutions that greatly enhance resilience and operational performance, ongoing learning and development are essential. (Qu et al., 2023a) highlights how businesses can use resource- and money-efficient strategies to adapt and become more resilient in the face of market fluctuations. A distinct viewpoint is provided by research by (Baba & Barnabas, 2021), which contends that although frugal innovation increases resilience, its effectiveness is primarily contingent upon the current organizational culture and leadership dynamics. Allegedly, thrifty innovation by itself may not be sufficient to foster resilience in unstable circumstances in the absence of a solid leadership base.

4.2.6 The Mediating of Adaptive Culture

The findings of this study indicate that adaptive culture plays a significant mediating role in the relationship between organizational factors and organizational resilience within contractor companies in Batam. Organizations that are able to foster an adaptive work culture tend to be more resilient in responding to change, whether technical, economic, or external in nature. The ability to embrace change, innovate, and adopt new technologies is critical to sustaining organizational endurance over time.

Field observations reveal that contractor firms in Batam are currently facing major challenges, such as digital transformation of project operations, pressure to meet international client standards, and a shortage of skilled labor. Companies with an adaptive culture have shown greater readiness to navigate these transitions through internal training, digital system adoption, and cross-functional collaboration. Thus, adaptive culture has been proven to enhance the organization's capacity to respond systemically and strategically to the evolving dynamics of the construction industry in Batam. Overall, adaptive culture serves as a crucial bridge linking organizational factors to organizational resilience. It enables organizations not only to withstand external pressures but also to turn them into opportunities for performance improvement and competitive advantage. Therefore, cultivating and strengthening an adaptive culture is a strategic imperative for building resilient contractor organizations that are prepared for future challenges.

Organization Resilience is directed to adaptive culture. An organization's ability to endure and recover from any unexpected problems is known for resilience. Organizations can respond more efficiently to changes, whether they are technical, economic, or external factors, when adaptive culture is adopted. This result of H7 shows that adaptive culture is able to mediate each variable, which this result also aligns with the previous study. Adaptive cultures are important for building resilience, particularly in the context of digital transition, as (Al Omoush et al., 2023) note. Based on their research, it can be concluded that an organization's resilience is directly enhanced by its capacity to innovate, adopt new technologies, and respond to outside interference. (Moghrabi et al., 2023) state that changes in culture are necessary to promote flexibility and responsiveness because of how digital transformation alters organizational operations. (Codara & Sgobbi, 2023) point out that pre-existing cultural qualities and leadership styles have an impact on how well digital transformation builds resilience. Their research is consistent with previous studies in that it highlights the importance of adaptability and learning in building resilience, which helps organizations recover from disasters more quickly.

4.2.7 The Influence of The Role of Adaptive Culture in Digital Business Transformation and Organizational Resilience

This study highlights the critical role of organizational learning and adaptive culture in strengthening resilience during digital transformation processes, particularly within contractor companies in Batam. In a highly dynamic and resource-constrained environment, the ability to continuously acquire, interpret, and respond to new information becomes a vital organizational competency. Companies that embrace learning as a collective practice are better positioned to generate innovative, cost-effective solutions commonly referred to as frugal innovations, which are especially essential when traditional approaches

are impractical or too expensive. The field data reveals that many contractor firms in Batam operate under tight deadlines, limited budgets, and rapidly changing project scopes. These conditions demand flexibility and rapid adaptation. Organizations that foster adaptive cultures and prioritize continuous learning are demonstrably more responsive to disruptions such as logistical delays or unexpected design changes by utilizing their internal knowledge base and collaborative decision-making practices. Firms that integrate digital tools and regularly reflect on project performance are better equipped to realign their strategies and sustain project continuity.

Furthermore, the findings confirm that the synergy between adaptive culture and organizational learning significantly enhances organizational resilience. Frugal innovations driven by learning processes enable firms not only to survive disruptions but also to maintain productivity and competitiveness under pressure. This capability reinforces long-term sustainability and strengthens the organization's capacity to endure and grow in the face of ongoing external challenges. Thus, building a resilient organization in the contractor sector requires not only structural preparedness but also a strong, adaptive mindset embedded across the organization.

Research supports the notion that frugal innovation fosters low-cost, creative solutions that are critical in resource-constrained environments that improve organizational learning and operational performance. This result also supports H8, which is that adaptive cultures mediate the digital business transformation with the organizational resilience. For the examples, these studies are those conducted by (Berndt et al., 2023a). The relationship between frugal innovation and organizational resilience is consistent with findings by (Al Omoush et al., 2023), who highlight the role that organizational learning plays in enabling cost-effective solutions when faced with constraints. Resilience and frugal innovation work together to improve an organization's capacity to continue operations and overcome unforeseen obstacles. Organizational learning and frugal innovation are fundamental to creating organizational resilience, and the synergy between these elements is critical for maintaining long-term viability.

5. CONCLUSION

The study conducted by this author shows evidence that digital business transformation in the workplace or company plays an important role in improving organizational resilience through the development of adaptive culture and organizational learning, especially in Indonesian contractors. Within the context of the general contractor industry, research highlights the crucial role that digital business transformation plays in strengthening organizational resilience. The way organizations function, interact with customers, and provide value is significantly altered as a result of this shift. Businesses may improve their agility and efficiency and become more capable of managing unforeseen upheavals and navigating turbulent markets by implementing digital tools and processes.

The research emphasizes how several elements that go into creating a resilient organization—like organizational learning, adaptable culture, and frugal innovation—are interconnected. One of the most important of these processes is digital business transformation, which makes it easier to plan strategically and come up with efficient answers to problems that arise in the modern corporate world. All things considered, the results highlight how crucial it is to include digital tactics while maintaining a sharp emphasis on innovation and ongoing learning to establish long-term resilience.

6. LIMITATION AND IMPLICATION

6.1. Limitation

The linkages between adaptive culture, frugal innovation, digital business transformation, organizational learning, and organizational resilience are all well explained in this paper. There are limitations to the generalizability of the study's findings across various businesses and geographical areas due to the small sample size of 295 respondents, who were mostly contractors in Batam. Selection bias could be introduced by the convenience sampling method, which could compromise the results'

robustness. Respondents may have given socially acceptable answers rather than entirely truthful ones, which increases the possibility of response bias when self-reported data is relied upon through surveys. This also becomes more difficult to determine causation between variables due to the cross-sectional form of the study, which also makes it more difficult to track how variables change and interact over time.

6.2. Implication

Due to this research being only focused on contractors, the writer would suggest to the next researcher that they should try to widen the sample to include a more diverse variety of industries, geographies, and organizational sizes to address the constraints of this specific study, offering a wider view on how frugal innovation and digital transformation affect organizational resilience. This would improve the findings' generalizability. To learn more about how the connection changes over time and support long-term resilience, the writer suggests that using longitudinal research might be helpful. This could use qualitative techniques to learn more in-depth information on organizational procedures, including case studies or interviews. Studying the influence of outside variables, like market dynamics and legal frameworks, could improve our comprehension of how companies adjust to change in diverse contexts. This would offer a more thorough understanding of the variables influencing resilience and creativity in various situations.

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