

Strategic Capabilities and Value Creation: Divergent Roles of Enterprise Risk Management, Digital Technology, and Resilience

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ABSTRACT

The mechanisms through which strategic capabilities generate sustainable competitive advantage remain poorly understood, particularly under extreme uncertainty. This study examines how enterprise risk management (ERM), digital technology adoption (DTA), and organizational resilience (OR) contribute to sustainable competitive advantage in Tanzania's mining industry. Drawing on the Resource-Based View and Dynamic Capabilities Theory, the study proposes that strategic capabilities generate competitive advantage through distinct organizational mechanisms. Data were collected from 172 senior executives representing mining companies in Tanzania and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The findings show that ERM significantly enhances OR, which subsequently strengthens sustainable competitive advantage. OR fully mediating the ERM-competitive advantage relationship. In contrast, DTA significantly enhances both OR and sustainable competitive advantage, but OR does not significantly mediate the relationship between DTA and sustainable competitive advantage. These findings suggest that ERM creates strategic value primarily through dynamic capability building and DTA generates value through direct pathways. The study extends the Resource-Based View by demonstrating that strategic capabilities differ in how their value is realized and contributes to Dynamic Capabilities Theory by highlighting the contingent role of OR in value creation. Overall, the study advances a Strategic Capability Heterogeneity perspective, showing that different strategic capabilities generate sustainable competitive advantage through distinct mechanisms.

1. Introduction

Sustaining competitive advantage in a highly uncertain and complex environment is one of the crucial factors that determines the long-term financial performance of any company. It is widely accepted that, to achieve sustainable competitive advantage, a company needs to acquire and deploy unique, valuable resources and capabilities. According to the resource-based view (RBV) theory, there are special features that resources should have in order to bring competitive advantage, such as value, rarity, inimitability, and non-substitutability (Barney, 1991). There are numerous unique resources existing in an organization that can be deemed fit to provide sustainable competitive advantage. It would be theoretically inappropriate to assume that different organizational strategic capabilities contribute to competitive advantage in broadly similar ways. Following this understanding, there are three important theoretical questions. Firstly, can all organizational strategic capabilities proposed by RBV theory bring competitive advantage? Secondly, do these strategic capabilities enhance competitive advantage through similar organizational mechanisms? Thirdly, given the stochastic nature of the world, can these strategic capabilities continue to provide the same value to the organization over time?

For a number of years, scholars have been trying to answer these questions within different study settings. Despite the theoretical and conceptual acceptance of the value of strategic capabilities for competitive advantage, empirical results remain inconclusive. There are a large number of empirical studies that report a positive relationship between strategic firm capabilities and firm outcomes; some report weak, insignificant, or context-dependent results (Helfat et al., 2023; Bergh et al., 2025). Various empirical results emphasize that the strategic value created by VRIN resources relies on other complementary capabilities, environmental conditions, organizational context, and the mechanism through which the specific resources are used (Kero & Bogale, 2023). Moreover, empirical research indicates that the pathway mechanisms used by different strategic capabilities to create greater competitive advantage vary substantially across firms and contexts, and having valuable resources alone does not necessarily bring sustained competitive advantage (Melesse, 2026; Pitelis et al., 2024). The stochastic nature of the organizational operating environment continues to erode the value of existing strategic capabilities and necessitates changes to the organization's unique resources to accommodate this volatility. Dynamic Capabilities Theory argues that organizations must continuously sense environmental changes, seize emerging opportunities, and reconfigure their resource base to maintain competitiveness under changing conditions (Teece, 2007). The theory emphasizes that unique resources do not guarantee competitive advantage unless organizations take deliberate actions to renew and redeploy these resources. A very fundamental strategic question arises from this theoretical perspective. What strategic capability can potentially empower organizations to renew their valuable resources before their competitive edge is lost in a highly dynamic environment?

Over the past two decades, enterprise risk management (ERM), digital technology adoption, and organizational resilience have increasingly been conceptualized as strategic organizational capabilities through which firms can respond to uncertainty, adapt to environmental change, and develop competitive capacity (Crawford & Jabbour, 2024; Li & Wang, 2024; Monazzam & Crawford, 2024; Su & Junge, 2023). Despite the fact that digital technology, organizational resilience, and ERM are strategic capabilities, they differ fundamentally in their nature, strategic purpose, and organizational functions.

Digital technology adoption refers to the degree to which an organization uses different digital technologies in its business model and operations to improve information assimilation, analysis, and communication, thereby enabling the making of timely, high-quality strategic decisions in response to dynamic business environments (Grego et al., 2025; Hoang et al., 2025).

Organizational resilience moves beyond its traditional sense in ecology to be understood as a capability that enables an organization to adapt, recover, and thrive in the midst of an uncertain environment (Hillmann, 2021). In addition, the strategic role of ERM beyond compliance and an internal control tool to a capability that enables an organization to make better, higher-quality decisions is on the rise (Crawford & Jabbour, 2024). Despite the existence of fundamental theoretical and conceptual arguments on the strategic roles of ERM, organizational resilience, and digital technology in sustaining competitive advantage, the empirical evidence is inconclusive. There are a number of empirical studies conducted to examine the relationship between ERM, organizational resilience, and digital technology independently (Crawford & Jabbour, 2024; Grego et al., 2025; Joussem et al., 2025). The results are inconclusive, and there are limited studies that examine their strategic interrelationship in creating sustainable competitive advantage in an extremely uncertain environment. To address the theoretical gaps identified above, this study investigates the mechanisms through which ERM and digital technology adoption (DTA) contribute to sustainable competitive advantage. The study examines how they create strategic value and whether they operate through similar or distinct organizational mechanisms. Organizational resilience is therefore examined as a potential strategic pathway linking both ERM and digital technology adoption to sustainable competitive advantage.

Using the resource-based view theory and dynamic capability theory, this study investigates the mechanisms through which enterprise risk management (ERM), digital technology adoption (DTA), and organizational resilience (OR) contribute to sustainable competitive in the mining industry. The mining industry is characterized by significant volatility related to commodity prices, regulations, technology, operational hazards, the environment, and expectations from stakeholders (Gagnon et al., 2024; Baghaei & Badri, 2024). It is argued that when the operating environment is extremely uncertain, efficiency in company operations will not be enough. There is a need for companies to develop the capability to withstand, adapt to, and recover from any potential disruption (Monazzam & Crawford, 2024; Hillmann, 2021; Su & Junge, 2023).

The study seeks to make three important theoretical contributions. First, it aims to extend the Resource-Based View (RBV) by examining whether strategically valuable organizational resources differ not only in their strategic value but also in the mechanisms through which that value is realized. The study examines whether ERM and digital technology adoption represent different categories of strategic capabilities that generate sustainable competitive advantage through distinct organizational processes. Second, the study seeks to contribute to Dynamic Capabilities Theory by examining the role of organizational resilience as a dynamic capability and mechanism used by ERM and digital technology adoption to create strategic value. ERM and digital technology adoption have been conceptually associated with organizational resilience.

2. Literature Review

2.1 Enterprise Risk Management and Value Creation

Enterprise risk management evolved as a formal extension of the silo approach to managing risks, resulting from the increasing complexity, uncertainty, and interconnectedness of risks in the operating business environment. The silo approach manages risks in a very fragmented way. ERM manages risks in an integrated way and provides a holistic view of an organization, with the sole purpose of preserving, creating, and enhancing the value of the organization (Bromiley et al., 2015; COSO, 2017). The major failures of companies during the 1990s and early 2000s led to the development of ERM because it was deemed that fragmented risk management was limited and raised the need for managing risks through an integrated approach (Fraser & Simkins, 2015; COSO, 2017). Although ERM started as a compliance and internal control mechanism, for the past two decades the understanding of ERM has shifted to be viewed as an organizational strategic capability.

Recently, ERM has been recognized and associated with a capability that may contribute significantly to organizations through improving strategic decision-making, enhancing organizational learning, and contributing to long-term value creation (Crawford & Jabbour, 2024). From a theoretical perspective, ERM can be regarded as a strategic organizational capability, as suggested by the resource-based view theory. Enterprise risk management tends to allow organizations to integrate risk information, synchronize organizational resources, and improve decision-making under uncertainty. Despite this growing theoretical recognition, empirical evidence regarding the strategic value of ERM remains inconclusive. For the past two decades, scholars have been investigating the impact and role of ERM within different organizational settings, and various proxies have been used to measure both the existence of ERM practices and the organizational value they create (Horvey & Odei-Mensah, 2023; Crawford & Jabbour, 2024).

A substantial body of empirical research suggests that ERM can improve firm outcomes, including organizational performance, firm value, competitive advantage, and risk outcomes. These benefits have been associated with mechanisms such as improved risk integration, reduced risk exposure, enhanced strategic decision-making, greater strategic flexibility, and improved organizational performance (Saeidi et al., 2019; Florio & Leoni, 2017; Saeidi et al., 2021; Lundqvist & Vil-helmsson, 2018; Ntare et al., 2022; Yoshikuni et al., 2025; Farrell & Gallagher, 2018; Prasadja et al., 2023; Resende et al., 2024; Lechner & Gatzert, 2016; Hoyt et al., 2011). Despite the growing body of ERM research, there remains considerable variation in how ERM is conceptualized and measured across empirical studies. Researchers have employed different proxies, including ERM indices, binary adoption indicators, Standard & Poor's ERM ratings, and ERM maturity measures (Anton & Nucu, 2020; Bailey, 2022; Horvey & Odei-Mensah, 2023). The variation creates challenges for comparing empirical findings because different measures may capture different dimensions or levels of ERM implementation. Recent reviews further indicate that differences in the conceptualization and measurement of both risk management and performance contribute to divergent empirical conclusions (Ciocoiu et al., 2025; Horvey & Odei-Mensah, 2023). Nevertheless, empirical findings on the consequences of ERM are not uniformly positive. Recent research and reviews indicate that ERM outcomes can vary according to implementation conditions, organizational characteristics, measurement approaches, and institutional context (Anton & Nucu, 2020; Eastman & Xu, 2021; Ciocoiu et al., 2025). For example,

Eastman and Xu (2021) demonstrate that the market consequences of ERM adoption vary with the timing of implementation and changes in regulatory and rating-agency environments. Salaudeen et al. (2026) report mixed relationships between ERM and alternative measures of bank performance.

Although numerous studies have examined the relationship between ERM and organizational performance, the majority have relied on financial indicators such as firm value, profitability, market value, and accounting performance (Hoyt & Liebenberg, 2011; Farrell & Gallagher, 2015; Florio & Leoni, 2017). Despite the strategic emphasis of the COSO ERM framework and Resource-Based View theory, very few studies have examined the impact of ERM on organizational outcomes using sustainable competitive advantage as the proxy in highly uncertain environments. Moreover, the existing body of ERM research has been dominated by evidence from developed economies, specifically in North America and Europe (Horvey & Odei-Mensah, 2023; Anton & Nucu, 2020; Berry-Stölzle et al., 2025).

There is a paucity of studies devoted to determining evidence for the strategic value of ERM in developing countries. It is argued that developing countries need more robust ERM because of their highly uncertain environments, yet the adoption of ERM in developing countries is low compared to the developed world (Silva et al., 2019). This paradoxical situation can be attributed to an inadequate understanding of the value and importance of ERM in developing countries. It is very important to conduct empirical studies in the developing world so as to improve awareness of the true value of ERM.

The current study is conducted in Tanzania as one of the developing countries to enhance the understanding of the strategic value of ERM in the universal context. In addition, empirical studies on ERM have mostly focused on financial institutions, more specifically banks and insurance organizations. This is due to the fact that these organizations were the first to adopt ERM practices because of regulatory requirements (Hoyt & Liebenberg, 2011). Less attention has been given to studying the strategic value of ERM within highly uncertain non-financial industries. Although mining industries are exposed to a significant number of risks, such as commodity price volatility, operational hazards, environmental risks, regulatory changes, and stakeholder pressures, evidence of the strategic value of ERM remains scarce. This study is conducted in the mining industry, which represents the minority context within which the value of ERM has been studied. Based on the gaps identified above, this study formulates the following hypothesis to test the value of ERM to organizational outcomes.

H1: ERM has a positive and significant effect on firm sustainable competitive advantage.

2.2 Enterprise Risk Management, Organization Resilience and Value Creation

Modern organizations are operating in a business environment characterized by volatile, uncertain, complex, and ambiguous conditions. Existing rapid technological change, geopolitical instability, climate-related disruptions, regulatory uncertainty, and evolving stakeholder expectations cause operational efficiency to be an inadequate factor in maintaining sustainable competitive advantage. Organizations must continuously adapt, learn, recover, and transform in response to environmental change because the assumptions underlying existing strategic resources can quickly become obsolete. The limitations of the Resource-Based View (RBV) in explaining how firms

sustain competitive advantage under rapidly changing environmental conditions led to the development of Dynamic Capabilities Theory.

According to the RBV, valuable, rare, inimitable, and non-substitutable (VRIN) resources create the foundation of sustainable competitive advantage. Dynamic Capabilities Theory contends that firms must also possess the capability to integrate, build, and continuously reconfigure these resources in response to environmental change (Teece et al., 1997; Teece, 2007). Therefore, maintaining sustainable competitive advantage does not rely only on the ownership of strategic resources but on the capability of firms to adapt and renew these resources in a dynamic environment.

Organizational resilience has been conceptualized as a strategic meta-capability that allows organizations to anticipate, absorb, adapt to, recover from, and eventually thrive following unexpected disruptions (Hillmann, 2021; Su & Junge, 2023). Modern ERM literature has moved beyond viewing ERM as merely a compliance or internal control system, conceptualizing ERM as a strategic organizational capability that improves enterprise risk awareness, strategic decision-making, and organizational preparedness (COSO, 2017). Though ERM and organizational resilience are conceptually different, they are theoretically complementary. Enterprise risk management enables organizations to assess and manage risks (COSO, 2017), and organizational resilience provides companies with the strategic capability to respond, adapt, recover, and transform from disruptive risk events (Hillmann, 2021). The complementarity between ERM and organizational resilience leads to an important theoretical question: Does ERM create strategic value directly, or does it generate value by strengthening organizational resilience, which subsequently enables sustainable competitive advantage? Addressing this question has become increasingly important as organizations operate in highly volatile and uncertain environments.

Current empirical studies emphasize that ERM creates organizational resilience. Studies by Monazzam and Crawford (2024), Eichholz et al. (2024), Lisdiono et al. (2022), and Jidda et al. (2025) show that effective risk management enables organizations to become aware of disruptions, coordinate responses, learn from adversity, and recover faster in dynamic environments. These study findings are evidence of the theoretical suggestion that ERM develops organizational resilience through wider situational awareness, preparedness, and adaptive decision-making. Despite these important contributions, the existing evidence remains fragmented. Many studies examine specialized forms of risk management, such as supply chain risk management or cyber risk management, rather than ERM. For example, Jazairy et al., (2024) investigated cyber risk management and cyber resilience and El Baz and Ruel (2021) focused on supply chain risk management and supply chain resilience during the COVID-19 pandemic. These empirical studies provide valuable insights within their respective domains, but their findings cannot be readily generalized to ERM because they examine specific risk management functions rather than integrated enterprise-wide risk management practices.

Furthermore, even studies that explicitly examine ERM and organizational resilience rarely operationalize ERM using the comprehensive COSO ERM framework. Instead, they frequently rely on ERM maturity indices, governance indicators, or selected ERM practices, which may not fully capture the multidimensional nature of enterprise risk management (Monazzam & Crawford, 2024; Lisdiono et al., 2022; Eichholz et al., 2024). Subsequently, empirical evidence remains limited regarding how comprehensive ERM

practices, measured across all eight COSO ERM components, contribute to the development of organizational resilience.

A substantial body of research indicates that organizational resilience contributes to organizational performance, innovation, adaptability, and sustainable competitive advantage by enabling firms to withstand disruptions, adapt to environmental changes, and capitalize on emerging opportunities (Linnenluecke, 2017; Marcucci et al., 2022; Wang et al., 2022; Liu & Zhang, 2024). Empirical evidence shows that organizational resilience can enhance firms' ability to maintain competitive advantage under changing environmental conditions (Wang et al., 2022; Liu & Zhang, 2024) and improve organizational performance and future survival prospects (Marcucci et al., 2022). However, comparatively little research has examined whether organizational resilience represents the mechanism through which enterprise risk management generates strategic value. This gap is particularly important in highly uncertain industries, where resilience may constitute a critical pathway through which enterprise-wide risk management contributes to sustainable competitive advantage. Accordingly, this study proposes that organizational resilience mediates the relationship between enterprise risk management and sustainable competitive advantage. The study hypothesizes the followings:

H2: There is a significant positive relationship between ERM and organizational resilience.

H3: There is a significant positive relationship between organizational resilience and sustainable competitive advantage.

H4: Organizational resilience mediates the relationship between ERM and sustainable competitive advantage.

2.3 Digital Technology Adoption and Value Creation

Organizations can no longer rely only on traditional information systems because the business environment is characterized by an increase in data volume, rapid technological change, shorter innovation cycles, and heightened competitive pressures. To respond effectively to the uncertain nature of the environment, most organizations are currently adopting advanced digital technologies to enhance strategic decision-making and organizational agility (Leischnig et al., 2016; Martínez-Caro et al., 2020). Reflecting the Resource-Based View (RBV) theory, digital technology adoption can be viewed as a strategic organizational resource and capability that can be successfully integrated into an organization's business model and processes to create competitive advantage (Barney, 1991). Digital technology adoption extends beyond the acquisition of technological infrastructure. It refers to the degree to which organizations implement and integrate digital technologies into their business processes to improve information acquisition, communication, analytics, decision-making, organizational learning, and strategic responsiveness (Ahmad et al., 2024; Grego et al., 2025).

Research on digital technology adoption expanded rapidly during the mid-2010s, driven by advances in Industry 4.0, artificial intelligence, cloud computing, big data analytics, and international digital transformation initiatives. Zhang and Wang (2024) attribute this growth to major international policy initiatives, including the OECD Digital Economy Outlook reports (2015, 2017) and the European Union's Digital Single Market Strategy,

which accelerated digital transformation across industries. Numerous empirical studies report that digital technology adoption improves firm performance by promoting innovation, enhancing operational efficiency, reducing costs, enabling new business models, and strengthening competitive advantage (Zhang et al., 2023; Yang et al., 2023; Zhong & Ren, 2023; Zareie et al., 2024; Long et al., 2024; Feng & Nie, 2024; Chen et al., 2023).

Despite the growing body of empirical evidence, the strategic value of digital technology adoption remains inconclusive. Though many studies report positive effects, others suggest that technology investments alone do not necessarily translate into superior organizational performance (Fernández-Rovira et al., 2021). The literature increasingly recognizes the existence of the digital productivity paradox. Organizations making comparable digital investments often experience markedly different performance outcomes (Gebauer et al., 2020; Kohtamäki et al., 2019). Earlier research conducted in information systems demonstrated that organizations investing similar amounts in information technology frequently realize different levels of organizational value (Hsu et al., 2006; Dhar & Sundararajan, 2007). The observed inconsistency has been attributed to differences in managerial capabilities, organizational readiness, digital maturity, and implementation quality by current studies.

There is a paucity of empirical studies conducted to examine how digital technology adoption creates strategic value in highly uncertain business environments. Moreover, most of the studies have been conducted in developed economies, and there is limited empirical evidence on how digital technology adoption influences sustainable competitive advantage in developing economies. This current study uses the Resource-Based View Theory to examine the relationship between digital technology adoption and sustainable competitive advantage in the Tanzanian mining industry. The study expects digital technology adoption to enhance competitive advantage. Accordingly, the following hypothesis is proposed:

H5: Digital technology adoption has a positive effect on sustainable competitive advantage.

2.4 Digital Technology Adoption, Organization Resilience and Value Creation

Despite the fact that digital technology adoption is considered to be a strategic capability that creates strategic value, relatively little is known about the pathway through which this strategic value is created. It is unequivocal that during times of turbulence and dynamic environments, organizations need to be resilient enough to withstand pressure and not only adapt and recover but also thrive in the midst of uncertainty (Do et al., 2022). According to Dynamic Capabilities Theory, possessing valuable resources is not enough to maintain competitive advantage; organizations need to continuously integrate, reconfigure, and deploy those resources in response to changing environmental conditions (Teece et al., 1997; Teece, 2018). Therefore, from the Dynamic Capabilities theoretical lens, digital technology adoption has been viewed as a strategic move that enables organizations to adapt faster in the midst of disruptions. Organizational resilience has been associated with dynamic capabilities that enable organizations to anticipate, absorb, adapt to, recover from, and thrive following unexpected disruptions (Hillmann, 2021; Su & Junge, 2023).

From a theoretical point of view, digital technology adoption tends to improve the ability of organizations to collect real-time information, facilitate better communication, and ensure knowledge integration. These improvements support faster and more informed strategic responses during periods of disruption and strengthen organizational resilience (Yang & Panichakarn, 2025). Digital resilience is emerging as the terminology that emphasizes the connection between resilience and digitalization (Martín-Rojas et al., 2026). According to Boh et al. (2023), digital resilience is the ability that organizations have by employing digital technology in their operations to enhance organizational transformation to a stable state that can withstand adversity by being able to absorb and adapt to disruptions and shocks. Currently, a considerable number of empirical study findings show that digital technologies positively influence organizational resilience through operational coordination, information visibility, organizational learning, and organizational adaptability (He et al., 2023; Yang & Panichakarn, 2025). Despite the existing body of research on digital technology adoption, the evidence remains isolated. Although empirical studies show that organizational resilience is influenced by digital technology adoption, relatively fewer studies have been conducted to examine how organizational resilience represents the pathway through which sustainable competitive advantage can be created by digital technology adoption (Martín-Rojas et al., 2026).

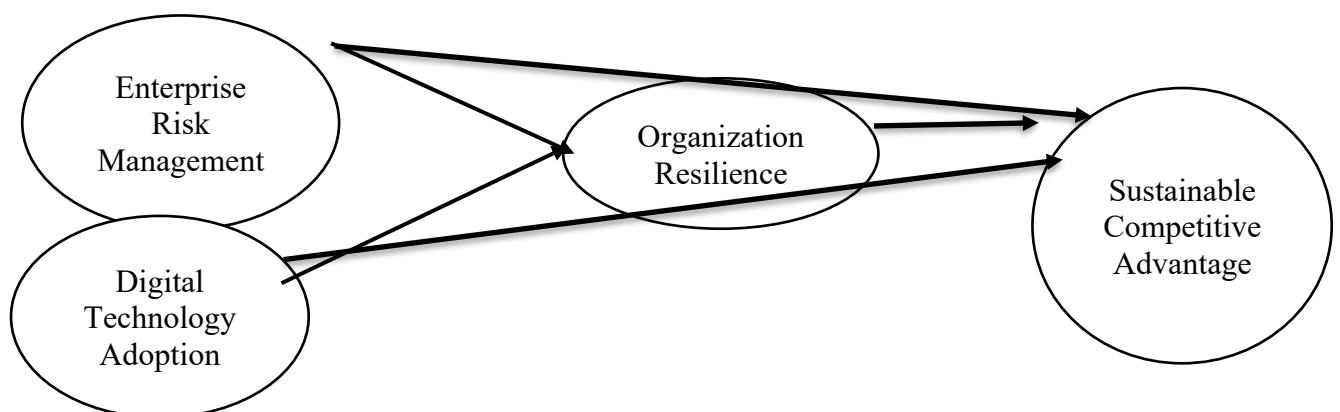
Most studies aimed to address the direct impact of digital technology on organizational performance or the direct relationship between digital technology adoption and organizational resilience. In addition, the empirical evidence on digital technology adoption, organizational resilience, and competitive advantage is limited in highly uncertain industries and developing economies. It is vital to understand how digital technology adoption and organizational resilience interact with one another to create strategic value because environmental uncertainty is substantially greater than in many developing countries. More importantly, the question of whether organizational resilience explains the relationship remains. This study hypothesizes the following:

H6: Digital technology adoption positively influences organizational resilience.

H7: Organizational resilience mediates the relationship between digital technology adoption and sustainable competitive advantage.

From the developed hypotheses, the study's conceptual model is shown in Figure 1.

Figure 1: Conceptual Model.



3. Methodology

3.1 Research Design and Data Collection

The current study employed a quantitative cross-sectional survey design to examine the relationships among enterprise risk management (ERM), organizational resilience (OR), digital technology adoption (DTA), and sustainable competitive advantage (SCA). Since the study aimed to test theoretically derived hypotheses and examine the structural relationships among latent constructs, the use of a quantitative approach was justified. Hair et al. (2022) argue that it is appropriate to use PLS-SEM if the study is prediction-oriented, consists of a complex model that includes multiple latent variables simultaneously, includes mediation analysis, and uses a moderate sample size. Accordingly, this study employed Structural Equation Modeling (SEM) to analyze the data quantitatively.

The Tanzanian mining industry was used as the empirical context to study the mechanism through which distinct strategic capabilities create organizational value in a highly uncertain operational environment. The mining sector is exposed to a significant number of risks, which necessitate companies to improve their adaptability capacity so as to sustain competitive advantage (Gagnon et al., 2024; Monazzam & Crawford, 2024). Data were obtained from one senior management officer from each participating organization, including managing directors, chief operating officers, chief risk officers, finance directors, risk managers, and compliance managers. The respondents were chosen due to their direct involvement in strategic decision-making and their knowledge of enterprise risk management, digital technology adoption, organizational resilience, and the competitive position of their organizations. Data were collected using a self-administered structured questionnaire over a six-month period. A total of 172 usable questionnaires were obtained and included in the final analysis. This sample size exceeds the minimum recommendations for Partial Least Squares Structural Equation Modeling (PLS-SEM), thereby providing adequate statistical power for estimating the proposed structural model (Hair et al., 2022).

3.2 Measurement of Variables

All the indicators used to measure the latent variables of the study were adopted and adapted from previously validated and used items from different studies, and all questionnaire items were measured using a five-point Likert scale ranging from 1 = Strongly Disagree to 5 = Strongly Agree, which has been widely adopted in organizational and strategic management research. Organizational resilience was conceptualized as a second-order reflective-formative dynamic capability comprising three first-order dimensions: situational awareness, adaptive capacity, and predictive capacity. These dimensions collectively represent an organization's capability to anticipate, absorb, adapt to, and recover from environmental disruptions. Enterprise Risk Management (ERM) was operationalized as a second-order reflective-formative construct using the eight components of the COSO Enterprise Risk Management Framework (COSO, 2017), namely internal environment, objective setting, event identification, risk assessment, risk response, control activities, information and communication, and monitoring activities. Collectively, the eight components measure the degree to which the organization engages in enterprise-wide risk management practices.

Sustainable Competitive Advantage (SCA) was measured using a multidimensional scale comprising seven strategic dimensions. The dimensions include product and service quality, innovation capability, managerial capability, profitability, corporate image, organizational flexibility, and organizational growth over the preceding three years. These dimensions collectively reflect the organization's ability to achieve and sustain superior competitive performance relative to competitors. Digital Technology Adoption (DTA) was measured using six items capturing the extent to which organizations have adopted digital technologies to support organizational processes and strategic decision-making. The measurement items assessed real-time information acquisition, information processing, predictive analytics, process automation, digital decision support, and workforce digital capability. Together, the indicators capture the extent to which digital technologies are embedded within organizational operations to enhance strategic responsiveness and operational effectiveness.

3.3 Demographic Profile

A total of 172 questionnaires were collected from respondents in the mining sector. The results show that 69.19% of the respondents were male and 30.81% were female. In terms of current job position, 43.60% were Managing Directors, followed by Heads of Risk Management (20.93%), Finance Directors (13.37%), and Risk Managers (11.05%). The remaining respondents were Compliance Managers (6.40%), Chief Risk Officers (4.07%), and Heads of Organization (0.58%). Regarding risk management experience, 36.63% of respondents had 6–10 years of experience, 32.56% had 3–5 years, and 28.49% had less than three years, while only 2.33% had more than 10 years of experience. In terms of education, 48.26% held bachelor's degrees and 45.93% held master's degrees. Only a small proportion held diplomas, advanced diplomas, or CPA qualifications. The demographic results are summarized in the table 1.

Table 1: Statistical Demographic Profile Result

Demographic characteristic	Category	Frequency (n)	Percentage (%)
Current job title	Managing Director	75	43.60
	Head of Risk Management	36	20.93
	Finance Director	23	13.37
	Risk Manager	19	11.05
	Compliance Manager	11	6.40
	Chief Risk Officer	7	4.07
	Head of Organization	1	0.58
Gender	Male	119	69.19
	Female	53	30.81
Risk management experience	Less than 3 years	49	28.49
	3–5 years	56	32.56
	6–10 years	63	36.63
	More than 10 years	4	2.33
Educational background	Bachelor's degree	83	48.26
	Master's degree	79	45.93
	Diploma	5	2.91
	Advanced Diploma	4	2.33

Demographic characteristic	Category	Frequency (n)	Percentage (%)
	CPA	1	0.58
Total		172	100.00

3.4 Measurement Model Assessment

The measurement model was assessed following the guidelines of Hair et al. (2022). Enterprise risk management (ERM) and organizational resilience (OR) were conceptualized as reflective–formative hierarchical component models (HCMs), and the two-stage (disjoint two-stage) approach was used to estimate the higher-order constructs. The use of the two-stage (disjoint two-stage) approach is justified for reflective–formative models due to its ability to produce stable estimates and minimize collinearity between lower-order and higher-order constructs (Hair et al., 2022). The reliability and validity of the reflective lower-order constructs were first assessed using indicator reliability, internal consistency reliability, convergent validity, and discriminant validity.

As shown in Table 1, all outer loadings ranged from 0.797 to 0.948, exceeding the recommended threshold of 0.70 and confirming indicator reliability. Cronbach's alpha values ranged from 0.923 to 0.960, while composite reliability values ranged from 0.938 to 0.969, indicating satisfactory internal consistency reliability. In addition, Average Variance Extracted (AVE) values ranged from 0.685 to 0.863, exceeding the recommended threshold of 0.50 and therefore confirming convergent validity. Discriminant validity was established because all Heterotrait–Monotrait (HTMT) ratios were below the recommended cut-off value of 0.85.

Table 2: Assessment of the Reflective Lower-Order Measurement Model

Construct (Lower-Order Dimension)	No. of Items	Cronbach's α	Composite Reliability (CR)	AVE	HTMT	Decision
Adaptive Capacity (ADC)	5	0.950	0.962	0.834	< 0.85	Supported
Predictive Capacity (PC)	5	0.936	0.951	0.795	< 0.85	Supported
Situational Awareness (SA)	4	0.933	0.952	0.832	< 0.85	Supported
Control Activities (CA)	5	0.940	0.954	0.807	< 0.85	Supported
Event Identification (EI)	5	0.929	0.946	0.778	< 0.85	Supported
Information& Communication (IC)	5	0.960	0.969	0.863	< 0.85	Supported
Internal Environment (IE)	5	0.939	0.954	0.805	< 0.85	Supported
Monitoring (MO)	5	0.932	0.948	0.786	< 0.85	Supported
Objective Setting (OS)	7	0.923	0.938	0.685	< 0.85	Supported
Risk Assessment (RA)	5	0.953	0.963	0.841	< 0.85	Supported
Risk Response (RR)	5	0.924	0.943	0.767	< 0.85	Supported
Digital Technology Adoption (DT)	6	0.948	0.959	0.795	< 0.85	Supported
Sustainable Competitive Advantage (SCA)	7	0.955	0.963	0.787	< 0.85	Supported

N=172

The higher-order formative constructs were assessed by examining collinearity and the significance of formative indicator weights. As shown in Table 2, all outer VIF values ranged from 1.448 to 2.670, well below the recommended threshold of 3.3, demonstrating that multicollinearity was not a concern. Also, the bootstrapping results show that all three dimensions of organizational resilience significantly contributed to the higher-order construct. For ERM, event identification, internal environment, risk assessment, and risk response reported non-significant weights, while the rest exhibited significant weights, as shown in Table 2. The ERM dimensions that reported non-significant weights were retained because of their theoretical significance in explaining the COSO ERM components. Each dimension represents a theoretically essential aspect of enterprise-wide risk management. Removing any component would change the conceptual domain of ERM and compromise its content validity. Moreover, the dimensions contribute to the content validity of the construct, consistent with the recommendations of Hair et al. (2022). The measurement model findings for the lower- and higher-order constructs have satisfactory psychometric properties and allow further analysis of the structural model.

Table 3: Evaluation of the Higher-Order Formative Constructs (ERM and Organizational Resilience)

Higher-Order Construct	Formative Dimension	Outer VIF	Weight (β)	t-value	p-value	Decision
Organizational Resilience	Adaptive Capacity	1.574	0.213	1.920	0.027	Supported
	Predictive Capacity	1.997	0.520	5.366	<0.001	Supported
	Situational Awareness	1.448	0.463	5.108	<0.001	Supported
Enterprise Risk Management	Control Activities	2.248	0.220	1.738	0.041	Supported
	Event Identification	1.841	0.173	1.533	0.063	Retained*
	Information & Communication	2.339	0.333	2.520	0.006	Supported
	Internal Environment	1.914	-0.099	0.801	0.211	Retained*
	Monitoring	2.016	0.358	3.157	0.001	Supported
	Objective Setting	2.498	0.229	1.679	0.047	Supported
	Risk Assessment	2.253	0.058	0.438	0.331	Retained*
	Risk Response	2.670	-0.053	0.319	0.375	Retained*

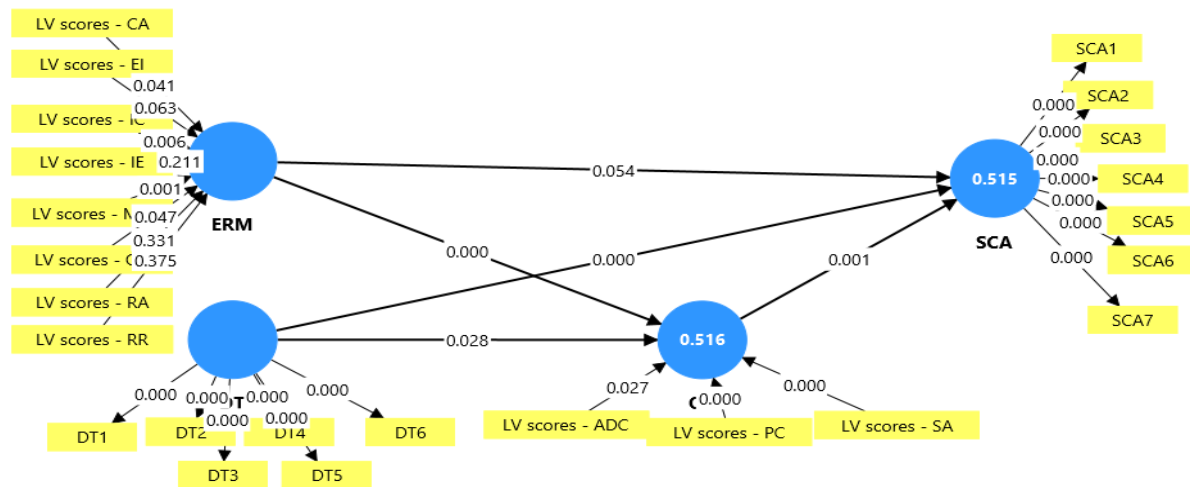
N=172

3.5 Structural Model Results

The structural model was evaluated using the bootstrapping procedure with 10,000 resamples, following the recommendations of Hair et al. (2022). Prior to hypothesis testing, the model's explanatory power, effect sizes, and model fit were assessed using the coefficient of determination (R^2), effect size (f^2), and the Standardized Root Mean Square Residual (SRMR). The coefficient of determination (R^2) indicated that enterprise risk management (ERM) and digital technology adoption (DTA) jointly explained 51.6% of the variance in organizational resilience ($R^2 = 0.516$). Correspondingly, ERM, DTA, and organizational resilience jointly explained 51.5% of the variance in sustainable competitive advantage ($R^2 = 0.515$), indicating moderate-to-substantial explanatory

power. Moreover, the SRMR value of 0.049 was below the recommended threshold of 0.08, suggesting an acceptable model fit.

Figure 2: Structural Modelling structure



As presented in the summary results in Table 3, the structural model revealed two distinct strategic value creation pathways. First, enterprise risk management exhibited a strong positive effect on organizational resilience ($\beta = 0.691$, $p < 0.001$). The direct effect of ERM on sustainable competitive advantage was not statistically significant ($\beta = 0.144$, $p = 0.054$). Organizational resilience, however, exerted a significant positive effect on sustainable competitive advantage ($\beta = 0.265$, $p = 0.001$). Mediation analysis further confirmed that organizational resilience fully mediated the relationship between ERM and sustainable competitive advantage ($\beta = 0.183$, $p = 0.001$). The mediation results demonstrated that ERM contributes to competitive advantage indirectly through strengthening organizational resilience. Second, a different pattern emerged for digital technology adoption. Digital technology adoption demonstrated a significant positive effect on both organizational resilience ($\beta = 0.098$, $p = 0.028$) and sustainable competitive advantage ($\beta = 0.519$, $p < 0.001$). Nevertheless, the indirect effect through organizational resilience was not statistically significant ($\beta = 0.026$, $p = 0.054$). This result further signifies that organizational resilience does not mediate the relationship between digital technology adoption and sustainable competitive advantage.

Effect size analysis further demonstrated substantial differences among the structural relationships. ERM exhibited a large effect on organizational resilience ($f^2 = 0.941$), with a negligible effect on sustainable competitive advantage ($f^2 = 0.021$). On the contrary, digital technology adoption demonstrated a large effect on sustainable competitive advantage ($f^2 = 0.521$) but only a negligible effect on organizational resilience ($f^2 = 0.019$). Organizational resilience showed a small-to-moderate effect on sustainable competitive advantage ($f^2 = 0.070$). The results are summarized in Table 3.

Table 4: Structural Model Results and Hypothesis Testing

Hypothesis	Relationship	B	t-value	f^2	Decision
H1	ERM $\rightarrow$ SCA	0.144	1.605	0.021	Not Supported

Hypothesis	Relationship	B	t-value	f ²	Decision
H2	ERM → OR	0.691***	15.086	0.941	Supported
H3	OR → SCA	0.265**	3.121	0.070	Supported
H4	ERM → OR → SCA	0.183**	3.083	—	Supported (Full Mediation)
H5	DTA → SCA	0.519***	10.680	0.521	Supported
H6	DTA → OR	0.098*	1.912	0.019	Supported
H7	DTA → OR → SCA	0.026	1.605	—	Not Supported

Notes: β = standardized path coefficient; t = bootstrap t -statistic; f^2 = effect size; ERM = Enterprise Risk Management; DTA = Digital Technology Adoption; OR = Organizational Resilience; SCA = Sustainable Competitive Advantage. Significance levels: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.

4. Discussion

The most important finding of this study is that enterprise risk management (ERM) does not directly enhance sustainable competitive advantage. The strategic value of ERM is created indirectly through organizational resilience. The results reveal that ERM has a strong positive influence on organizational resilience. Moreover, the direct influence of ERM on sustainable competitive advantage was statistically insignificant. However, the indirect effect of ERM through organizational resilience was significant. These study results challenge the implicit assumption in much of the ERM literature that enterprise risk management tends to have a mechanical impact on organizational performance. Rather, the findings of this study propose that ERM primarily functions as a capability-building resource that enhances sustainable competitive advantage by strengthening an organization's ability to anticipate, adapt to, and recover from disruptions.

This finding contributes to the Resource-Based View (RBV) by providing a more nuanced understanding of how organizational resources generate strategic value. RBV traditionally argues that sustainable competitive advantage arises from valuable, rare, inimitable, and non-substitutable (VRIN) resources (Barney, 1991; Wernerfelt, 1984). Nevertheless, the present findings suggest that the strategic contribution of organizational resources differs not only in their value but also in the mechanisms through which that value is realized. Despite ERM being representative of a valuable organizational capability, it is not likely to have a direct contribution to the superior competitive advantage of an organization in highly uncertain environments. The current study extends the RBV by signifying that certain strategic resources create value indirectly through the development of complementary organizational capabilities rather than through immediate economic returns. Furthermore, the findings also extend Dynamic Capabilities Theory.

Teece et al. (1997) argue that firms sustain competitive advantage by integrating, building, and reconfiguring organizational resources in response to environmental change. The current study demonstrates that ERM performs precisely this capability-building function. Rather than directly improving competitive performance, ERM develops organizational resilience capability that enables firms to continuously reconfigure organizational resources during periods of uncertainty. Accordingly, organizational resilience emerges as the dynamic capability through which ERM

translates into sustainable competitive advantage. This finding shifts the theoretical understanding of ERM from a governance and compliance mechanism toward a strategic capability-building system that enables organizational adaptation in volatile environments.

The findings of this study are consistent with recent studies arguing that ERM contributes to organizational resilience and long-term organizational performance (Monazzam & Crawford, 2024; Eichholz et al., 2024; Lisdiono et al., 2022). Also, the previous literature on organizational resilience is extended by demonstrating that organizational resilience is not merely an associated organizational outcome. It is suggested that organizational resilience represents the dominant strategic pathway through which ERM generates sustainable competitive advantage under conditions of extreme uncertainty.

The results of the study show that digital technology adoption has a negligible influence on organizational resilience but a very large effect on sustainable competitive advantage. Furthermore, organizational resilience did not mediate the relationship between digital technology adoption and sustainable competitive advantage. These findings imply that, unlike ERM, the predominant way through which digital technology influences sustainable competitive advantage is not by building another higher-order capability. Digital technology adoption directly enhances sustainable competitive advantage through improvements in operational efficiency, information quality, innovation, coordination, and decision speed.

The current finding that digital technology adoption directly enhances sustainable competitive advantage is consistent with a number of past studies, which indicated that the use of digital technologies creates superior organizational performance through increasing operational efficiency, enhancing innovation capability, strengthening information processing, and improving strategic decision-making (Zhang et al., 2023; Bai et al., 2024; Long et al., 2024; Ren et al., 2024; Zareie et al., 2024). Similarly, studies by Teng et al. (2022), Bhandari et al. (2023), Guerra et al. (2023), Yang et al. (2023), and Zhong and Ren (2023) reached comparable conclusions. These empirical studies suggested that digital transformation enables firms to improve productivity, organizational agility, and competitive positioning through digital integration and innovation. Consequently, the observed strong direct influence of digital technology adoption on sustainable competitive advantage in this study supports this growing consensus.

In addition, the findings of the current study are consistent with a number of past studies indicating that digital technology adoption enhances organizational resilience (Martín-Rojas et al., 2026). Nevertheless, the study findings contradict some previous studies, which indicated that organizational resilience mediates the relationship between digital transformation and organizational performance (Mei & Idris, 2026; He et al., 2026; Zhu et al., 2026). The present study empirically demonstrates that the strategic value of digital technology adoption to the organization is not necessarily realized through the organizational resilience pathway. This study proposes that, within the Tanzanian mining industry, organizational resilience is not the pathway through which digital technology creates strategic value.

The lack of a mediation effect can be explained based on the nature of digital technologies themselves, which tend to have an immediate impact on organizational

decision quality. The impact is realized because digital technology adoption improves real-time information acquisition, analytical capability, communication, process automation, and operational coordination. Contrary to ERM, which primarily influences organizational routines and strategic preparedness. Accordingly, organizations may realize competitive advantages immediately after adopting digital technologies without necessarily requiring the intermediate development of organizational resilience capabilities. Furthermore, this argument is well established in the RBV theory, which emphasizes information-processing capability and technological resources as valuable strategic assets capable of generating direct competitive advantages.

Building upon the study findings, this study extends the concept of strategic capability heterogeneity. Strategic capability heterogeneity explains the empirical observation that organizational strategic capabilities differ not only in their strategic importance but also in the organizational mechanisms through which they generate sustainable competitive advantage. Some capabilities primarily create value indirectly by developing complementary organizational capabilities. Other capabilities generate direct strategic value by improving organizational effectiveness. Within this study context, ERM represents a capability-building strategic resource that creates value primarily through organizational resilience before influencing organizational performance. On contrast, digital technology adoption signifies a direct strategic capability whose strategic value is realized directly by improving information processing, operational efficiency, innovation, organizational coordination, and decision quality. Following this proposition, organizations should not assume that all strategic capabilities enhance performance through similar organizational processes.

Moreover, this proposition contributes to Dynamic Capabilities Theory by challenging the implied assumption in some of the study that dynamic capabilities operate through a common organizational pathway. The study findings indicate that organizations possess heterogeneous strategic capabilities that create value through different combinations of direct and indirect organizational pathways. This can partially provide an explanation for the mixed empirical findings frequently reported across studies examining ERM, digital technology, and organizational resilience. The current study findings extend the ongoing theoretical discussion within the enterprise risk management (ERM) literature by emphasizing that, although it is important to study the direct strategic value of ERM, it is also relatively important to investigate the pathways through which value is created. Most past studies examined only the direct relationship between ERM and organizational outcomes, including firm performance, firm value, profitability, and competitive advantage. Despite the fact that these studies have significantly increased the understanding of the strategic value of ERM, the current study findings imply that investigating only the direct relationship of ERM with other organizational outcomes can potentially provide an incomplete explanation of its strategic contribution. Accordingly, future ERM research would benefit from placing greater emphasis on understanding the organizational mechanisms through which ERM generates strategic value.

Moreover, the study proposes that conceptualizing ERM as merely an internal control framework designed to reduce organizational losses or as a governance tool can potentially undervalue its broader strategic importance. Even though ERM implementation may still be considered an internal control and governance tool, it is very important to move beyond that understanding and view ERM as an organizational capability that systematically develops the conditions necessary for organizational

resilience. Within this perspective, the strategic value of ERM lies less in its immediate financial or operational outcomes than in its capability-building role. Enterprise risk management provides the organization with the capability to be resilient enough to sustain competitive advantage in a turbulent operational environment by strengthening organizational predictive capability, adaptive capacity, and situational awareness. This interpretation provides one possible explanation for the inconsistent findings reported in previous ERM–performance studies and highlights the importance of incorporating intermediate organizational capabilities when examining the strategic consequences of ERM.

The study emphasizes that, in highly uncertain environments such as mining, organizations derive greater strategic benefits when ERM is translated into enhanced predictive capability, adaptive capacity, and situational awareness. The resulting organizational resilience enables firms to respond proactively to the dynamic environment and sustain competitive advantage. On the contrary, digital technology adoption followed a different strategic pathway. Despite the significant positive contribution of digital technology adoption to organizational resilience, the strategic value created followed a direct path. The findings indicate that, in the Tanzanian mining industry, the strategic value of digital technology adoption is realized directly from improvements in information acquisition, processing, analysis, and enhanced decision-making quality. Subsequently, the value of digital technology adoption is justified without the need for another organizational mechanism, such as organizational resilience, to play a mediating role. Overall, the study findings suggest that organizations operating in highly uncertain industries should avoid assuming that all strategic capabilities generate competitive advantage through similar organizational pathways. Managers and other important stakeholders should understand that ERM and digital technology adoption perform complementary but distinct strategic functions. Aligning these complementary capabilities may therefore provide a more comprehensive approach to sustaining competitive advantage under conditions of extreme uncertainty.

5. Conclusion

This current study investigated how enterprise risk management (ERM), digital technology adoption (DTA), and organizational resilience (OR) contribute to sustainable competitive advantage under conditions of extreme uncertainty. The results of this study make two important theoretical contributions. First, the study extends the Resource-Based View by suggesting that the strategic value of organizational resources is not only defined by possessing VRIN characteristics. The organizational mechanism through which a particular capability generates value may justify its strategic value. In this study, the value of ERM did not come from its direct contribution but rather from building another capability, namely organizational resilience, which in turn enhanced sustainable competitive advantage. Second, the study extends Dynamic Capabilities Theory by demonstrating that it is not necessary for different strategic resources to use the same mechanism to deliver organizational value in the same operational environment. As empirically observed in the distinct value-creation mechanisms between ERM and digital technology adoption, this study suggests that the value creation of particular valuable resources relies on their intrinsic strategic characteristics and organizational functions.

The practical suggestion from this study context is that firms operating in highly uncertain business environments should move beyond using ERM as an internal and

governance control tool. Rather, ERM should be considered a strategic tool that essentially increases predictive capability, adaptive capacity, and situational awareness. These three parameters, enhanced by ERM, tend to make organizations more resilient and act as the foundation for long-term competitiveness. Moreover, firms should strategically adopt digital technology and integrate its application into the decision-making process so as to improve decision quality through improvements in information quality, responsiveness, operational coordination, and innovation.

The findings should, however, be interpreted in light of several limitations. First, the study employed a cross-sectional research design and therefore did not capture how the suggested relationships among ERM, organizational resilience, and digital technology adoption develop over time. Second, the study is contextualized in the Tanzanian mining industry and cannot be generalized. It is suggested that future research be conducted across different sectors, countries, and institutional environments using longitudinal research designs so as to validate the nature of the relationships suggested in this study. Moreover, considerable attention should be given to examining other pathways through which ERM and digital technology can create strategic value in organizations. Such mechanisms can include organizational learning, strategic agility, innovation capability, knowledge integration, and decision quality. Further observation of different mechanisms through which strategic value can be realized can potentially refine and extend the concept of Strategic Capability Heterogeneity.

Finally, this study highlights and corresponds to the point that the central objective in strategic management studies should not only be examining whether strategic capabilities create strategic value. Considerable attention should be given to studying the organizational mechanisms through which strategic value is realized. In addition, there has been a significant increase in volatility, uncertainty, complexity, and ambiguity in the business operating environment. The need for organizations to understand the heterogeneous mechanisms through which strategic capabilities generate sustainable competitive advantage may become just as important as identifying the capabilities themselves.

Ethical Approval and Consent to Participate

Ethical approval was obtained from Universiti Tunku Abdul Rahman (UTAR) and the Tanzania Commission for Science and Technology (COSTECH). All participants were assured of the confidentiality and anonymity of their responses and the data collected were used solely for academic purposes.

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Conflict of Interest

The authors declare there are no conflicts of interest.

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