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Digital Transformation and Technology Management: A Qualitative Analysis of Organizational Capabilities Strengthening

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ABSTRACT
This study aims to analyze the role of technology management in improving organizational performance by strengthening innovation and organizational capabilities. Rapid technological developments require organizations to not only adopt technology but also manage it strategically to create value and competitive advantage. The research approach used was qualitative with an exploratory design. Data were obtained through in-depth interviews, observations, and documentation studies of informants directly involved in organizational technology management. Data analysis was conducted using thematic coding techniques to identify key patterns and themes. The results show that planned technology management aligned with organizational strategy plays a crucial role in driving innovation, strengthening organizational capabilities, and improving performance sustainably. Effectively managed digital transformation supports operational efficiency and quality decision-making. This study provides theoretical contributions to the development of technology management studies and practical implications for organizational leaders in formulating adaptive technology management strategies in the era of digital transformation.

Keywords: Technology Management, Innovation, Digital Transformation, Organizational Capabilities, Organizational Performance.

I. Introduction

Technological developments have become a major force shaping the dynamics of modern organizations and the global business environment. Technology impacts nearly every aspect of organizational activity, from production processes and information systems to communication patterns and strategic decision-making mechanisms. Technology-driven transformations encourage organizations to make continuous adjustments to survive and compete in an increasingly complex and uncertain environment (Porter & Heppelmann, 2015). These changes position technology as a strategic resource that requires planned and integrated management. The role of technology is no longer limited to improving operational efficiency, but also contributes to value creation and competitive advantage. The use of technology enables organizations to develop new business models, improve service quality, and respond to market needs more quickly and accurately (Bharadwaj et al., 2013). This situation requires organizations to possess managerial capabilities that are not solely technically oriented but also capable of aligning technology with the organization's vision, mission, and strategy.

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Technology management has emerged as an approach that emphasizes the importance of systematic technology management to support the achievement of organizational goals. This concept views technology as a combination of hardware, software, knowledge, and processes that must be managed in an integrated manner (Khalil, 2000). The focus of technology management includes technology planning, innovation development, technology system implementation, and evaluation of their impact on organizational performance. This approach emphasizes that the success of technology adoption is largely determined by the quality of the accompanying managerial decisions. Increasingly intense business competition reinforces the urgency of implementing effective technology management. Organizations face pressure to continuously innovate to maintain a competitive position in the market. Technology-based innovation is a key instrument for creating product and service differentiation (Schilling, 2017). An organization's capability to strategically manage technology contributes to the speed of innovation, operational flexibility, and the organization's ability to respond to changes in the external environment.

Empirical evidence shows that technology adoption does not always result in improved organizational performance. Many organizations fail to optimally utilize technology despite significant investments. These problems often stem from weak integration between technology and business strategy, low managerial competency, and organizational resistance to change (Westerman et al., 2014). This indicates that the existence of technology alone is insufficient to create value without the support of effective technology management practices. Managerial capability is a key factor in determining the success of technology management. Managers are required to understand the potential of technology, assess its risks and benefits, and direct its utilization according to organizational needs. This perspective aligns with the Resource-Based View theory, which emphasizes the importance of managing unique and difficult-to-imitate strategic resources to create competitive advantage (Barney, 1991). Appropriately managed technology can serve as a strategic resource that adds value to an organization.

The Dynamic Capability approach reinforces the view that organizations need to develop the ability to integrate, build, and reconfigure technological resources as the environment changes (Teece et al., 1997). Technology management plays a role in ensuring that technology is not only adopted but also continuously adapted to market demands and external developments. This dynamic capability enables organizations to maintain long-term relevance and competitiveness. Digital transformation expands the scope of technology management into strategic and organizational aspects. Digitalization drives changes in organizational structure, work culture, and interaction patterns between work units. Digital technology enables cross-functional collaboration, real-time data integration, and analytics-based decision-making (Vial, 2019). This situation demands technology management that is able to manage change holistically and oriented towards value creation.

Various previous studies have shown a positive relationship between technology management and organizational performance. Effective technology management contributes to increased productivity, service quality, and customer satisfaction (Zhang et al., 2016). These findings confirm that technology management impacts not only operational aspects but also the achievement of an organization's strategic goals. This contribution is increasingly relevant in the context of organizations facing ongoing technological disruption. A research gap remains regarding the mechanisms by which technology management comprehensively impacts organizational performance. Some studies emphasize technology adoption, while the managerial role in managing technology remains underexplored. Approaches that integrate technology management, innovation, and organizational capabilities still require empirical and conceptual strengthening (Dodgson et al., 2008). This gap opens up opportunities to deepen the study of technology management as a strategic organizational factor. This research focuses on analyzing the role of technology management in driving improved organizational performance by strengthening innovation and organizational capabilities. This study positions technology management as a key variable bridging the relationship between technology utilization and performance achievement. This approach is expected to provide a more comprehensive understanding of how organizations can manage technology strategically and sustainably.

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II. Literature Review and Hypothesis Development

2.1. Technology Management

Technology management is a field of study that focuses on the planning, development, utilization, and control of technology to support the achievement of organizational goals. Technology is understood not only as technical tools but also as knowledge, skills, procedures, and systems integrated into organizational activities (Khalil, 2000). This perspective emphasizes that an organization's success in utilizing technology depends heavily on managerial ability to manage it strategically. Technology management positions technology as a strategic resource that must align with the organization's vision and strategy. Effective technology management enables organizations to optimize the value of technology investments, reduce the risk of implementation failure, and enhance competitive advantage (Dogson et al., 2008). The primary focus of technology management includes technology planning, innovation management, technology integration into business processes, and evaluating the impact of technology on organizational performance. The role of technology management becomes increasingly important with the increasing complexity of technology and the accelerating pace of change in the business environment. Organizations are required to possess the ability to select appropriate technology, manage the technology life cycle, and ensure its alignment with market and stakeholder needs. This approach demonstrates that technology is inseparable from an organization's strategic decision-making process

2.2. Innovation Management

Innovation management focuses on managing the process of creating and implementing new ideas that are valuable to an organization. Innovation is understood as a process encompassing the development of new products, services, processes, and business models that can improve organizational performance (Schilling, 2017). This perspective positions innovation as the result of the interaction between technology, human resources, and managerial systems. Innovation management emphasizes the importance of organizational structure, culture, and leadership in supporting the innovation process. Organizations that systematically manage innovation tend to have a higher level of adaptability to environmental changes. Technology-based innovation management enables organizations to accelerate product development processes, increase efficiency, and create sustainable differentiation (Tidd & Bessant, 2018). The relationship between technology management and innovation management is complementary. Technology management provides a framework for managing technological resources, while innovation management plays a role in directing the utilization of technology into economic and strategic value. The integration of these two approaches is a crucial foundation for organizations oriented towards long-term growth and competitiveness.

2.3. Digital Transformation

Digital transformation refers to the process of fundamental organizational change through the use of digital technology to create new value and improve organizational performance. This transformation encompasses changes in strategy, organizational structure, business processes, and work culture (Vial, 2019). Digital technologies such as big data, artificial intelligence, and platform-based systems encourage organizations to operate in a more integrated and responsive manner. Digital transformation is not only about adopting new technologies but also requires a shift in mindset and managerial capabilities. The success of digital transformation is greatly influenced by an organization's ability to manage change and align technology with business strategy (Westerman et al., 2014). This perspective emphasizes the importance of technology management as a key driver of digital transformation. Digital transformation expands the role of technology management into strategic and organizational aspects. Effective digital technology management

ISSN [Online]: 2776-6411

enables organizations to improve decision-making, strengthen customer relationships, and create dynamic business ecosystems. This context positions technology management as a key element in the ongoing digital transformation process.

2.4. Resource-Based View

The Resource-Based View views organizations as a collection of heterogeneous and difficult-to-imitate resources. Competitive advantage is achieved through the management of resources that are valuable, rare, difficult to imitate, and non-substitutable (Barney, 1991). This perspective provides a theoretical foundation for the role of technology as an organization's strategic resource. Effectively managed technology can meet the criteria for a strategic resource within the RBV framework. The value of technology lies not only in its technical aspects, but also in the organization's ability to integrate technology with business processes and managerial competencies. Technology management plays a role in ensuring that technology makes a significant contribution to value creation and competitive advantage. The RBV emphasizes the importance of an organization's capabilities in managing technological resources uniquely. Organizations that are able to develop distinctive technology management practices have a greater chance of sustaining competitive advantage. This perspective strengthens the relationship between technology management, innovation, and organizational performance.

2.5. Dymanic Capability

Dynamic Capability extends the RBV framework by emphasizing an organization's ability to respond to dynamic environmental changes. Dynamic capability is defined as an organization's ability to integrate, build, and reconfigure resources as the environment changes (Teece et al., 1997). This perspective is relevant in the context of rapid and unpredictable technological developments. Technology management contributes to the development of an organization's dynamic capabilities. Adaptive technology management enables organizations to adjust strategies, processes, and structures according to technological developments and market needs. This capability supports organizations in maintaining long-term performance and competitiveness. Dynamic Capability emphasizes the importance of organizational learning and technology-based strategic decision-making. Organizations with strong dynamic capabilities tend to be more responsive to technological disruption and changes in the external environment. This perspective emphasizes the strategic role of technology management in building organizational resilience.

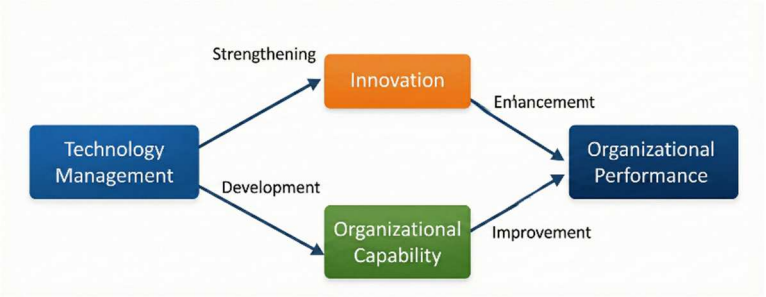

Figure 1. Conceptual Framework

III. Research Method

This research uses a qualitative approach to gain an in-depth understanding of the role of technology management in improving organizational performance. A qualitative approach was chosen because it allows researchers to explore phenomena contextually, holistically, and interpretively, reflecting the realities faced by organizations in managing technology. The primary focus of the research is directed at the meanings,

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experiences, and managerial practices related to technology management and their implications for organizational innovation and capabilities. The research design used is exploratory and descriptive. This approach aims to comprehensively describe the technology management processes implemented by organizations and their accompanying dynamics. This research seeks not only to identify technology management practices but also to understand the factors influencing the success and challenges faced by organizations in the context of technological transformation.

The research subjects were selected purposively, taking into account the involvement of informants in the decision-making process and technology management within the organization. Informants included organizational leaders, technology managers, and other parties with strategic roles in technology planning and implementation. Informants were selected based on criteria such as experience, knowledge, and direct involvement in technology management activities, ensuring that the information obtained is relevant to the research objectives. Data collection techniques included in-depth interviews, observation, and documentation studies. In-depth interviews were used to explore informants' perspectives, experiences, and interpretations regarding technology management practices and their impact on organizational performance. Observations were conducted to understand the context of technology implementation and the interactions between actors in the managerial process. Documentation studies included analysis of organizational documents, internal reports, technology policies, and other written sources relevant to the research focus.

The research instrument was a semi-structured interview guide, developed based on the research's theoretical foundation and conceptual framework. The interview guide allowed flexibility in gathering in-depth information while maintaining consistency in the themes discussed. This instrument was developed to capture aspects of technology planning, innovation management, digital transformation, and organizational capabilities. Data analysis was conducted qualitatively, following the stages of data reduction, data presentation, and conclusion drawing. The data obtained were analyzed through a coding process to identify key themes emerging from the interviews, observations, and documentation. The analysis process was conducted iteratively and continuously to ensure the relationship between the empirical data and the research's theoretical framework. Data validity was maintained through triangulation of sources and methods. Information obtained from various informants and data collection techniques was compared to ensure consistency and validity of the findings. This process aimed to increase the credibility of the research results and minimize researcher bias in data interpretation.

IV. Result and Discussion

4.1. Analysis Result

Table 1. Research Information

Informant Code	Position	Length of Work	Role in Technology Management
I1	Director	12 years	Strategic technology policy makers
I2	IT Manager	8 years	Technology systems planner and manager
I3	Operations Manager	10 years	Integration of technology into business processes
I4	Head of Innovation Division	7 years	Technology-based innovation development
I5	Digital Supervisor	5 years	Technology implementation and monitoring

GOLDEN RATIO
ISSN [Online]: 2776-6411

Table 2. Interview Findings

Main Theme	Subtheme	Description of Findings
Technology Planning	Strategic alignment	Technology is planned in alignment with the organization's vision and goals.
	Needs analysis	Technology decisions are based on operational and market needs.
Innovation Management	Process innovation	Technology is used to increase work efficiency
	Service innovation	Digitalization of services increases user satisfaction
Digital Transformation	Digitalization of processes	Manual processes shift to integrated digital systems
	Decision-making	Digital data supports faster and more accurate decisions
Organizational Capabilities	Technology learning	Organizations encourage the improvement of HR digital competencies
	Adaptability	Organizations are more responsive to technological changes

Table 3. Observation Result

Observation Aspect	Observation Findings
Work process	Operational activities have been integrated with digital systems
Pola komunikasi	Utilization of digital platforms accelerates cross-unit coordination
Data usage	Operational data is used as a basis for decision making
Work culture	A work culture that is adaptive and open to technology has emerged

Table 4. Document Analysis Results

Document Type	Key Findings
Strategic plan	Technology is positioned as a strategic priority for the organization
IT Policy	There are formal guidelines regarding technology management and security.
Performance report	Improved efficiency and quality of service after technology adoption
Innovation report	Technology-based innovation becomes a key performance indicator

Table 5. Synthesis of Research Findings

Technology Management Aspects	Impact on Organization
Strategic technology planning	Technology supports the achievement of organizational goals
Innovation management	Improve efficiency and quality of service
Digital transformation	Speed up processes and decision making
Organizational capabilities	Improving adaptability and competitiveness

The research results indicate that technology management has been strategically implemented and integrated into organizational activities. Research informants play key roles in technology planning, implementation, and evaluation, providing a comprehensive overview of technology management practices at the strategic and operational levels. Informant profiles reflect cross-functional involvement that supports comprehensive technology management. Interview findings reveal that technology planning is conducted with consideration for alignment between technology and organizational goals. Technology-based innovation management practices contribute to increased work process efficiency and service quality. Digital transformation has driven the digitization of business processes and strengthened data-driven decision-making. Organizational capabilities develop through technological learning and increased adaptability to environmental changes.

Observations show that technology has been integrated into daily work processes and accelerated coordination between organizational units. Digital communication patterns and operational data utilization reflect a shift in work culture toward a more adaptive and responsive technology culture. Documentation

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analysis demonstrates consistency between the organization's strategic policies and implemented technology management practices. The synthesis of findings confirms that technology management plays a critical role in improving organizational performance by strengthening innovation, digital transformation, and organizational capabilities. Planned and adaptive technology management practices support the achievement of organizational goals and strengthen competitiveness in the face of a dynamic, ever-changing environment.

Table 6. Review of the Review

Year	Research/ Author	Focus Variable	Key Findings	Relevance to This Research
2023	Syafi'i, Brawijaya & Hakim	Digital transformation, management innovation	Digital transformation and innovative management impact organizational sustainability and performance.	Demonstrates the relationship between innovation technology and organizational performance, in line with the focus of this research.
2024	Dewi, Rohimah & Purnamasari	Technology, strategic management	Integration of advanced technology and innovative management strategies improves operational efficiency and competitiveness.	Supports the concept that technology adoption related to technology management impacts organizational performance.
2023	Chege et al. (via ScienceDirect)	Technology innovation and technological complexity	Innovation technology improves organizational performance; external factors influence its effectiveness	Emphasizing the role of technological innovation as a determinant of performance improvement, in line with this research framework
2024	Afif, Wardi & Rino	Digital transformation, innovation, organizational learning	Digital transformation strengthens organizational capabilities through innovation and learning, then improves performance.	Provides empirical evidence that innovation and organizational learning are important mediators in the technology–performance relationship.
2025	Zururi, Andriyansah, Lesmana & Ijiis	Technology innovation management	Technology innovation management contributes to operational efficiency and competitiveness	Supports the finding that technology innovation management is positively related to organizational outcomes.

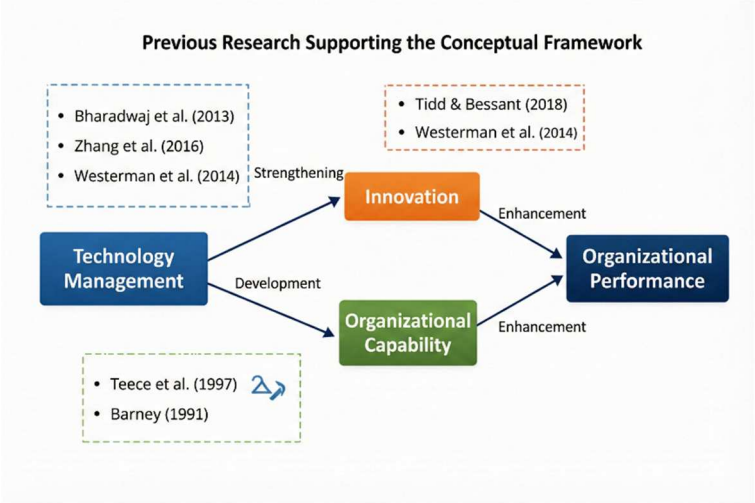

Figure 2. Previous research that supports the conceptual framework

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A review of previous research from 2020–2025 consistently demonstrates the strategic role of technology management in improving organizational performance. Numerous studies confirm that digital transformation and technology management integrated with organizational strategy can drive operational efficiency, innovation, and organizational competitiveness. These findings demonstrate that technology delivers optimal value when managed through systematic and adaptive managerial practices. Previous studies also emphasize the role of innovation management as a critical mechanism bridging the gap between technology and organizational performance. Technology-based innovation has been shown to enhance organizations' ability to respond to environmental changes, improve service quality, and create sustainable value. Organizational capabilities, including learning and adaptability, emerge as key contributing factors to the successful use of technology.

4.2. Discussion

The research results show that technology management plays a strategic role in improving organizational performance by strengthening innovation and organizational capabilities. This finding indicates that technology is not merely understood as an operational tool, but as a strategic resource that requires integrated managerial management. Technology planning practices aligned with the organization's vision and strategy enable optimal technology utilization and are oriented towards long-term value creation. Technology planning based on organizational needs is one of the key findings of the study. Informants emphasized that decisions regarding technology adoption and development are based on an analysis of operational needs and market demands. This finding aligns with the perspective of technology management, which emphasizes the importance of alignment between technology and organizational strategy (Khalil, 2000). Previous research also shows that integrating technology into managerial strategy contributes to increased organizational efficiency and competitiveness (Dewi et al., 2024).

Technology-based innovation management emerged as a key factor strengthening the relationship between technology management and organizational performance. Interview results indicated that technology is utilized to drive process innovation and service innovation. Digitalization of work processes improves efficiency and accuracy, while technology-based service innovation enhances user satisfaction. These findings are consistent with research by Tidd and Bessant (2018), which emphasized that systematically managed innovation can improve organizational performance. Research by Chege et al. (2023) also demonstrated that technological innovation significantly contributes to improved organizational performance across various industry contexts. Digital transformation serves as a crucial context for understanding the role of technology management. Observations and documentation indicate that the digitization of work processes and the utilization of data have transformed organizational decision-making patterns. Previously intuitive decisions are now supported by more accurate and real-time data. These findings reinforce the view that digital transformation is not solely about technology, but also about changes in organizational processes and culture (Vial, 2019). Research by Westerman et al. (2014) confirms that the success of digital transformation is largely determined by adaptive technology management practices and leadership.

Organizational capability emerges as a crucial mechanism bridging the relationship between technology management and performance. The research findings indicate increased technological learning and organizational adaptability along with the implementation of effective technology management. Organizations encourage the improvement of human resource digital competencies through training and continuous learning. This perspective aligns with the Resource-Based View theory, which views capabilities as strategic resources that are difficult to imitate (Barney, 1991). Research by Afif et al. (2024) also shows that digital transformation strengthens organizational capabilities through innovation and learning. The findings of this study can also be explained through the Dynamic Capability perspective. Adaptive technology management enables organizations to respond more quickly to environmental changes and technological disruption. An organization's ability to adapt strategies and work processes reflects dynamic capabilities that

ISSN [Online]: 2776-6411

support sustainable organizational performance (Teece et al., 1997). Research by Zururi et al. (2025) reinforces these findings by demonstrating that technological innovation management contributes to organizational efficiency and competitiveness. This study's results reinforce previous research findings from the 2020–2025 period, which emphasized that technology management, innovation, and digital transformation are interconnected in influencing organizational performance. The primary contribution of this research lies in a more comprehensive understanding of the managerial role in managing technology as a strategic organizational resource.

V. Conclusion

This study concludes that technology management plays a crucial role in improving organizational performance by strengthening innovation and organizational capabilities. Technology management aligned with organizational strategy promotes operational efficiency, decision-making quality, and organizational adaptability to environmental changes. Effectively managed digital transformation strengthens technology's position as a strategic resource that supports sustainable competitive advantage. The theoretical implications of this study enrich the study of technology management by integrating the perspectives of innovation, Resource-Based View, and Dynamic Capability. The practical implications of this study provide guidance for organizational leaders in formulating adaptive technology management strategies oriented toward value creation. The limitations of this study lie in the context and number of informants, therefore, further research is recommended to expand the object and combine quantitative approaches to strengthen the generalizability of the findings.

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