

# Digital Transformation and Technological Innovation in the National Banking Sector: A Grounded Theory Approach

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## ABSTRACT

**Purpose:** This study explores the dynamics of digital transformation and technological innovation in Indonesia's banking sector by examining how innovation is created, adopted, and interpreted within banking organizations.

**Research Method:** A qualitative Grounded Theory approach was employed. Data were collected through in-depth interviews, non-participant observations, and document analysis at selected state-owned and Islamic banks in Makassar, Indonesia. Data were analyzed using open, axial, and selective coding, supported by constant comparison and theoretical memoing.

**Results and Discussion:** The findings show that sustainable digital transformation is shaped by the interaction of four main elements: leadership vision, organizational culture, technological integration, and human adaptability. These elements reinforce one another in directing strategy, fostering an innovation-oriented environment, and enabling employees to adjust to digital change. From these patterns, the study formulates the substantive theory of Adaptive Organizational Synergy.

**Implications:** This study enriches innovation and digital transformation literature by emphasizing organizational and interpretive dynamics. In practice, it provides guidance to policymakers and banking leaders on designing human-centered digital transformation strategies. Future studies are recommended to test this theory across regions, banking models, and wider digital ecosystems.

**Keywords:** digital transformation; banking innovation; organizational culture; leadership; adaptive synergy.

## Introduction

Digital transformation in the banking sector has emerged as a concrete manifestation of Innovation Diffusion Theory, proposed by Everett Rogers (2003), which explains how innovations are adopted and communicated among individuals and organizations within a social system. In the banking context, technological innovations such as mobile banking, digital onboarding, artificial intelligence (AI), and big data analytics have played a crucial role in reshaping how banks interact with customers, manage risks, and enhance operational efficiency. In addition, the Technology–Organization–Environment (TOE) Framework (Tornatzky & Fleischer, 1990) provides a complementary theoretical foundation for understanding how technological, organizational, and environmental factors influence the adoption of digital innovations in financial institutions. Hence, this study is grounded in the



theoretical perspective that technological innovation in banking is not merely a technical endeavor but also a social and strategic process involving multi-level organizational dynamics.

A growing body of research indicates that technological innovation has become a major driver of transformation in the global banking industry. For instance, Vives (2019) emphasizes that fintech and digitalization have expanded financial inclusion while simultaneously disrupting traditional banking business models. In the Indonesian context, Widyastuti & Nugroho, (2022) found that the implementation of digital banking significantly enhances customer satisfaction through ease of access and faster service delivery. Meanwhile, recent state-of-the-art international studies highlight a paradigm shift from operational efficiency toward the integration of AI-driven systems, cybersecurity frameworks, and personalized customer experiences (PwC, 2023; Deloitte, 2022). However, most of these studies remain quantitative, focusing on measurable impacts or outcomes of innovation rather than the underlying social and organizational processes that shape the adoption and institutionalization of digital technologies. This suggests a persistent gap in understanding the human and cultural dimensions of digital transformation within banking organizations.

The research gap arises from the limited number of studies exploring how technological innovation in banking is socially constructed, adopted, and interpreted by actors within financial institutions, particularly in emerging economies such as Indonesia. Prior research tends to adopt a top-down perspective, emphasizing policy impacts or adoption rates, while overlooking the bottom-up processes of adaptation and learning within organizations. However, the success of digital transformation depends not only on technological readiness but also on human resource capacity, organizational culture, leadership support, and perceptions of technological risk. In this regard, the Grounded Theory approach is methodologically relevant, as it enables an in-depth exploration of social interactions, organizational meanings, and adaptive behaviors surrounding digital innovation. Given the acceleration of digitalization following the COVID-19 pandemic and the rapid expansion of fintech-based services, a qualitative exploration of these dynamics is both an academic necessity and a matter of practical urgency.

Building on the above discussion, this study acknowledges that technological innovation is a central factor shaping the evolving landscape of Indonesia's banking industry. While prior studies have significantly contributed to understanding the quantitative aspects of performance and customer satisfaction, they have not sufficiently uncovered the organizational learning processes and interpretive mechanisms underlying digital adoption. Accordingly, this study seeks to develop a substantive theory of digital transformation in the Indonesian banking sector through a Grounded Theory approach, focusing on the interaction among technology, people, and organizational systems. The study specifically addresses the following research questions:

- How is technological innovation formed within the process of digital transformation in the national banking sector?
- What factors influence the adoption and implementation of technological innovation in banking institutions?
- How do organizational actors, both managerial and operational, perceive and interpret the meaning of technological innovation?
- What conceptual model or substantive theory can be derived from the observed processes and experiences of digital transformation?

The novelty of this study lies in its contextual theorization of digital transformation as a socially embedded process. By integrating sociotechnical and organizational perspectives within the Indonesian context, the research aims to generate an empirically grounded model that bridges classical innovation theories with contemporary digital realities in emerging-market banking institutions. From a theoretical perspective, the study contributes to the discourse on digital innovation and organizational change, particularly by expanding the use of Grounded Theory in banking and financial technology. From a practical standpoint, the findings are expected to assist bank management in formulating human-centered digital strategies and to inform regulators such as Bank Indonesia and the Otoritas Jasa Keuangan (OJK) in designing adaptive digital policies. Furthermore, the research provides social and economic insights into how technological innovation can strengthen financial inclusion, service efficiency, and public trust in Indonesia's digital banking ecosystem.

## Literature Review and Hypothesis Development

### *The Concept of Technological Innovation in Banking*

Technological innovation in banking can be understood as the application of various forms of information and digital technologies to improve operational efficiency, expand service reach, and create added value for customers. Rogers, (2003) In his Diffusion of Innovations Theory, he defines innovation as an idea, practice, or object perceived as new by an individual or adopting unit. In contrast, diffusion is the process by which an innovation is communicated through specific channels over time among members of a social system. In the banking industry, technological innovation not only includes mobile and internet banking but also involves integrating emerging technologies such as blockchain, artificial intelligence (AI), big data analytics, and machine learning to support decision-making and risk management. (Vives, 2019). These innovations drive the transformation of traditional banking business models toward greater openness, connectivity, and data-driven approaches.

The Technology–Organization–Environment (TOE) Framework developed by Tornatzky & Fleischer, (1990) explains that three dimensions influence an organization's decision to adopt technological innovation: 1) Technological factors (e.g., ease of use, security, compatibility); 2) Organizational factors (e.g., management support, resources, innovation culture); and 3) Environmental factors (e.g., regulations, competitive pressure, market demands). In the context of national banking, these three dimensions interact to determine the success of digital innovation implementation.

### *Digital Transformation in the Banking Industry*

Digital transformation in the banking sector is a systemic process that integrates digital technologies across all aspects of business operations and financial services. According to Hess et al. (2016), digital transformation is not solely about implementing technology; it also encompasses fundamental changes in organizational strategy, structure, and mindset across all levels of the institution. A study by Susanti et al., (2021) revealed that banking digitalization in Indonesia experienced a significant acceleration following the COVID-19 pandemic, as customers increasingly shifted to digital channels for conducting financial transactions and accessing services. Similarly, Widyastuti & Nugroho, (2022) found that customer satisfaction substantially improved in banks that adopted mobile banking systems with personalization and robust security.



At the international level, recent state-of-the-art research indicates a paradigm shift from the digitalization of services toward the transformation of data-driven business models. Deloitte (2022) identified four core pillars underpinning modern digital banking transformation: customer centricity, data-driven culture, agile operations, and ecosystem collaboration. Furthermore, PwC (2023) emphasized that the adoption of artificial intelligence (AI) and automation has become a key determinant of competitive advantage in the global banking industry. However, most existing studies emphasize the outcomes of digital transformations, such as efficiency gains and customer loyalty, while offering limited exploration of the social and organizational processes underlying these changes. In this context, the Grounded Theory approach becomes particularly relevant, as it enables a deeper understanding of the dynamics and meanings of digital transformation from the perspectives of internal banking actors.

## *Organizational Dynamics and Innovation Culture*

Organizational culture is a key determinant of the successful adoption of technological innovation. According to Schein (2010), organizational culture refers to a pattern of basic assumptions developed by a group as it learns to cope with problems of external adaptation and internal integration. In the banking context, an innovation-oriented culture is reflected in values such as openness to change, cross-departmental collaboration, and a strong orientation toward learning and continuous improvement. Research by Al-Kahtani & Al-Muharrami (2020) revealed that an adaptive organizational culture combined with transformational leadership significantly contributes to the successful implementation of digital banking in the Middle East. Similarly, in the Southeast Asian context, Nguyen & Simkin (2021) found that resistance to change often arises from insufficient digital literacy among employees rather than from the technological systems themselves. These human factors highlight that digital transformation should be perceived as a process of organizational learning, rather than merely the adoption of new tools or systems. Consequently, this study views technological innovation in banking as the outcome of a complex interaction between technology, organizational structures, and social agents within financial institutions.

## *The Grounded Theory Approach in Studies of Innovation and Transformation*

The Grounded Theory approach (Glaser & Strauss, 1967) is employed to develop theories that emerge directly from empirical data, rather than to test pre-existing theoretical frameworks. This approach is particularly relevant to studies of innovation and transformation, as it enables researchers to explore how and why social processes unfold in specific contexts. In the study of banking innovation, Grounded Theory has been used to examine how innovative ideas are formed, the interactions among actors, and the organizational mechanisms that enable adaptation to technological change (Corbin & Strauss, 2015).

For instance, a study by Kwon and Park (2020) in South Korea, using the Grounded Theory approach, found that the success of digital transformation in banks is largely determined by mutual trust between leadership and employees and by flexibility within organizational structures. This finding underscores that transformation processes are not linear outcomes of technological policy decisions but are instead the result of complex social negotiations. Accordingly, this study employs the Grounded Theory approach to develop a substantive theory explaining the social processes and organizational culture that influence the success of technological innovation in the Indonesian banking industry. Based



on the aforementioned studies, several key insights can be synthesized as follows: Banking technology innovation has evolved from mere service digitalization toward organizational transformation and the development of data-driven business strategies.

Organizational culture and leadership play a central role in determining the success of technology adoption. Previous literature remains largely dominated by quantitative approaches, while qualitative studies exploring the underlying social dynamics of digital transformation remain limited. The Grounded Theory approach is considered the most appropriate for gaining an in-depth understanding of this phenomenon and for developing a theoretical model grounded in Indonesia's empirical context. Accordingly, this study explores the processes, meanings, and lived experiences of actors involved in the digital transformation of the national banking sector. The aim is to develop a substantive theory that elucidates the complex interactions between technology, organization, and human agency within the context of Indonesian banking institutions.

Building upon the synthesis of existing literature, it becomes evident that digital transformation in the banking industry is not merely a technological advancement but a multifaceted organizational and social process shaped by cultural, structural, and human dynamics. The gaps identified in previous studies—particularly the limited exploration of contextual and experiential dimensions underscore the need for a more interpretive and grounded approach. Therefore, the next chapter outlines the research methodology employed in this study, which adopts the Grounded Theory approach to systematically explore and theorize the processes, meanings, and interactions underlying technological innovation within Indonesian banking institutions. This methodological framework provides a rigorous foundation for generating theory that is both empirically grounded and contextually relevant to the dynamics of digital transformation in the national banking sector.

## Research Method

### *Research Design*

This study adopted a qualitative approach using Grounded Theory to develop a theory grounded in empirical data on the processes of digital transformation and technological innovation in the Indonesian banking sector. This design was deemed appropriate because the study's purpose was not to test pre-existing theories but to generate a new, context-specific theoretical understanding of how innovation is constructed, interpreted, and implemented within banking institutions. Grounded Theory was particularly well-suited to answering the main research questions, as it enabled an in-depth exploration of how and why social and organizational processes unfold (Corbin & Strauss, 2015). Through iterative data collection and analysis, the researcher identified emerging patterns, categories, and relationships, leading to the conceptual modeling of digital innovation behavior in banks. The research followed the constructivist Grounded Theory tradition, which emphasizes that theory emerges through interactions between the researcher and participants, influenced by context, interpretation, and reflexivity (Charmaz, 2014). This approach ensured flexibility and authenticity in uncovering the meanings behind technological transformation processes.

### *Research Setting and Participants*

The research was conducted in several selected banks in Makassar, Indonesia, representing both national commercial banks (e.g., Bank Mandiri) and Islamic banks (e.g., Bank Syariah Indonesia, Bank



Sulselbar Syariah). These institutions were chosen because they were at different stages of digital transformation and had implemented various technological innovations, including mobile banking, QRIS services, AI-based customer support, and digital onboarding systems.

The participants consisted of individuals directly involved in or affected by digital innovation processes within the banking system. Participants were selected using theoretical sampling, in which participant selection and data collection were guided by the emerging concepts and categories identified during analysis rather than by predetermined quotas (Glaser & Strauss, 1967).

The participant categories included:

- Bank executives or managers involved in digital transformation policymaking.
- IT and operations staff responsible for managing technological systems.
- Frontline employees (customer service and tellers) who interact with digital systems daily; and
- Customers or end-users utilizing digital banking platforms.

The number of participants was not predetermined; data collection continued until theoretical saturation was reached, at which point no new conceptual insights emerged from additional interviews. To maintain confidentiality, all participants were assigned anonymized codes. The first letter of the code indicates the participant group (e.g., M for Manager, O for Operational Staff, IT for Information Technology personnel, C for Customer), followed by a sequential number representing the interview order (e.g., O4 denotes the fourth operational staff member interviewed). The institutional abbreviation (e.g., BSI for Bank Syariah Indonesia, BM for Bank Mandiri, BS for Bank Sulselbar Syariah) identifies the participant's organization.

### *Data Collection Procedures and Instrumentation*

Data were collected using multiple qualitative techniques to ensure the depth and credibility of findings, namely in-depth interviews, observations, and document analysis.

- In-depth Interviews

The primary data collection technique involved semi-structured, in-depth interviews with participants. Interviews were guided by a flexible protocol derived from sensitizing concepts identified in the literature review: innovation formation, organizational adaptation, and actors' lived experiences. Interview questions focused on participants' perceptions, adaptation strategies, and organizational responses to technological change. All interviews were audio-recorded with participants' consent, transcribed verbatim, and securely stored for analysis.

- Observations

Non-participant observations were conducted within the banks' operational environments to capture daily interactions between staff and digital systems, as well as manifestations of innovation-related organizational culture. Field notes were maintained to record behavioral patterns and contextual nuances.

- Document Analysis

Supplementary data were obtained from internal reports, strategic plans, and regulatory documents from institutions such as Bank Indonesia and the Otoritas Jasa Keuangan (OJK). These materials were analyzed to provide contextual triangulation and policy alignment.



## *Data Analysis Techniques*

Data analysis followed the three-phase coding procedure of Grounded Theory (Strauss & Corbin, 1998; Charmaz, 2014):

- Open Coding – Breaking down data into discrete segments to identify key concepts and initial categories.
- Axial Coding – Reconnecting categories to establish relationships among causal conditions, contexts, and consequences.
- Selective Coding – Integrating categories around a core category that captures the central phenomenon (e.g., organizational learning in digital transformation).

A constant comparative method was employed throughout the process to refine conceptual relationships. Analytical memos were maintained to document emerging insights and theoretical linkages. Data management and coding were facilitated by NVivo, ensuring systematic organization and transparency.

## *Data Validation and Trustworthiness*

The credibility and rigor of the research were ensured using the four criteria proposed by Lincoln and Guba (1985):

- Credibility – Achieved through triangulation of interviews, observations, and documents, and verified via member checking with participants.
- Transferability – Supported through rich, thick descriptions of the context and participants, allowing readers to assess applicability to other settings.
- Dependability – Ensured through a detailed audit trail documenting research decisions and analytical steps.
- Confirmability – Strengthened by reflexive journaling and self-awareness to minimize researcher bias.

## *Ethical Considerations*

The study adhered to ethical principles governing social research involving human participants. Informed consent was obtained from all participants after they were fully briefed on the research purpose, procedures, and confidentiality measures. Participant identities were anonymized using pseudonyms and codes, and all data were securely stored. Ethical clearance was obtained from the institutional review board prior to data collection.

## *Summary of Methodological Flow*

- Preparation Phase – Conducted literature review, conceptual sensitization, and preliminary design of interview protocols.
- Fieldwork Phase – Data collection through interviews, observations, and document analysis, accompanied by ongoing memo writing.
- Analysis Phase – Open, axial, and selective coding conducted iteratively until theoretical saturation was achieved.
- Theory Building – Integration of categories into a substantive theory or conceptual model.



- Validation Phase – Triangulation, member checking, and reflexive validation to ensure trustworthiness.

This structured yet flexible methodological design ensured that the research process was both systematic and replicable, while preserving the interpretive depth necessary for qualitative inquiry under the Grounded Theory paradigm.

## *Overview of the Research Process*

Data were collected through 18 in-depth interviews with bank managers, IT specialists, operational staff, and customers across three banking institutions in Makassar: Bank Mandiri, Bank Syariah Indonesia (BSI), and Bank Sulselbar Syariah. Additional data were gathered through non-participant observations of banking operations and document analysis of digital transformation strategies, internal reports, and public disclosures. Data were analyzed using the Grounded Theory method following open coding, axial coding, and selective coding. The iterative constant comparison technique was applied throughout to identify recurring patterns and emerging categories. This process yielded three major themes (core categories) explaining the process of technological innovation and digital transformation in Indonesian banking institutions:

- Technology-Driven Transformation – innovation as a strategic response to digital disruption.
- Organizational Adaptation and Learning – internal adjustment processes driven by culture and leadership.
- Meaning-Making and Trust Formation – how actors interpret innovation and build trust in digital systems.

## Results and Discussion

### **Analysis Result**

#### *Technology-Driven Transformation*

The first theme reveals that the adoption of digital innovation in banks was not merely a technical decision but a strategic necessity driven by market competition, regulatory encouragement, and shifting customer expectations. Interview data indicated that most managers viewed digitalization as a survival mechanism amid fintech competition.

***“Digitalization is no longer optional. The pandemic accelerated it — if we do not adapt, we lose customers overnight.” (M2, Bank Mandiri)***

Observations confirmed that while banks introduced AI-based customer services and upgraded mobile banking platforms, integration challenges persisted. Fragmented legacy systems delayed full automation and required manual validation for certain back-end processes. These findings show that technological innovation functions simultaneously as an enabler and a disruptor, forcing banks to balance rapid adoption with operational coherence.

#### *Organizational Adaptation and Learning*

The second core finding concerns the internal adaptation process within banking organizations. Successful transformation required not only new technologies but also shifts in organizational culture



and leadership mindset. Middle managers often acted as change intermediaries, bridging strategic directives from top management with the operational realities faced by staff.

***“Technology alone does not change the bank. It is how people respond — whether they feel supported, trained, and trusted to use it.” (O4, BSI)***

Training programs, mentorship sessions, and internal campaigns, such as “Go Digital,” reduced employee resistance, especially among senior staff unfamiliar with new systems. Field observations revealed informal peer learning groups that emerged organically, where employees shared troubleshooting tips and success stories via internal messaging platforms. These adaptive behaviors illustrate that transformation unfolds as a collective learning process, driven by communication, shared experience, and mutual support.

### *Meaning-Making and Trust Formation*

The third theme highlights how actors construct meaning and build trust toward digital innovation. Many employees initially associated “digitalization” with job insecurity and loss of interpersonal connection with customers. Over time, however, trust developed as they observed tangible improvements in service delivery and customer feedback.

***“At first, customers did not trust the mobile app. They preferred to come to the branch. But after seeing instant transfers and no queues, their trust grew and so did ours.” (C5, Bank Sulsebar Syariah)***

For customers, trust was fostered through visible reliability and secure transactions. For employees, it grew from consistent managerial support and transparency regarding technological changes. These findings suggest that trust and meaning are negotiated through ongoing interaction between human and technological actors, creating the emotional foundation for sustainable digital transformation.

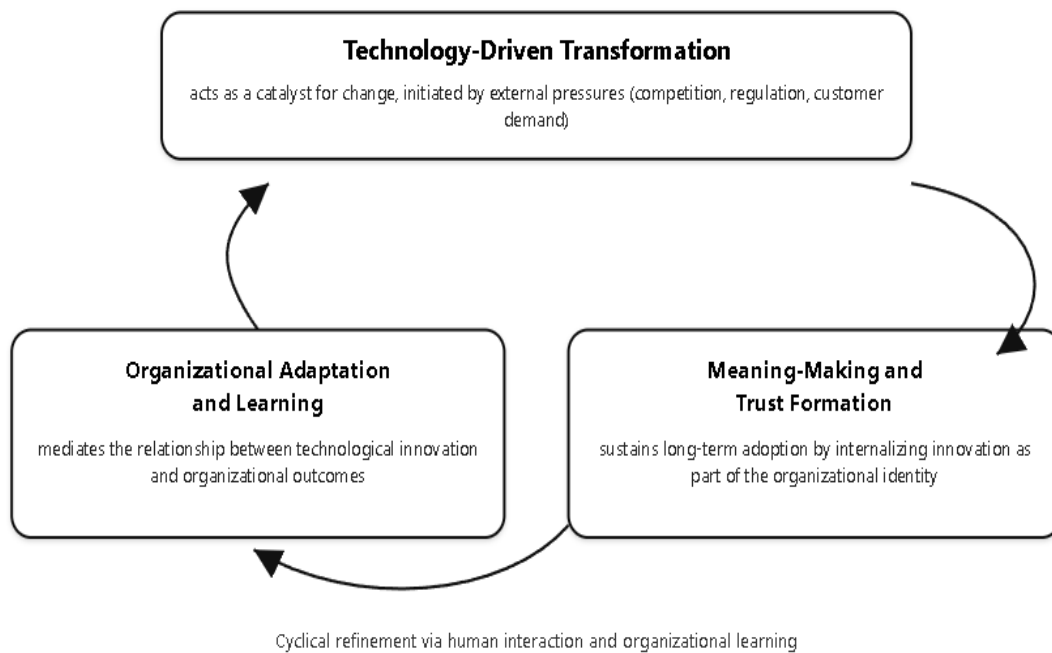
### *Emergent Theoretical Model*

Based on these findings, an emergent conceptual model was developed to represent the interconnection among the three themes (Figure 1). Technology-Driven Transformation acts as a catalyst for change, initiated by external pressures such as competition, regulation, and customer demand. Organizational Adaptation and Learning serves as the mediating mechanism linking innovation to performance outcomes. Meaning-making and trust formation ensure sustainability by embedding innovation into the organizational identity. Together, these processes create a cyclical transformation model in which innovation is continuously refined through feedback from human interaction and organizational learning.



**Table 1. Summary of Findings**

Theme / Category	Key Findings	Supporting Evidence
Technology-Driven Transformation	Innovation driven by competition and customer needs; integration barriers persist.	M2, Bank Mandiri; IT Staff, BSI
Organizational Adaptation and Learning	Leadership, training, and peer learning determine adoption success	O4, BSI; D3, Bank Sulsebar
Meaning-Making and Trust Formation	Trust evolves through consistent experience and transparency	C5, Sulsebar; E1, Customer Service



**Figure 1. Emergent Model of Digital Transformation in Banking**

**Conclusion**

The findings indicate that digital transformation in the Indonesian banking sector is a socio-technical evolution, rather than a purely technological revolution. While previous studies (Vives, 2019; Deloitte, 2022) emphasized technological readiness and efficiency, this study reveals that the real drivers of sustainable transformation lie in leadership adaptability, organizational learning, and shared meaning. The emergent Grounded Theory model expands existing frameworks by demonstrating that technology adoption succeeds only when accompanied by trust, continuous learning, and cultural alignment.

The results correspond with the Technology–Organization–Environment (TOE) Framework (Tornatzky & Fleischer, 1990), which suggests that technological innovation depends on contextual readiness. However, this study extends TOE by integrating social trust and meaning-making as dynamic mediators of adoption. Similarly, the transformation process aligns with Rogers’ (2003) Diffusion of Innovations Theory, yet goes beyond individual adoption behavior by embedding it within collective organizational learning. The evidence also supports Schein’s (2010) view that culture acts as a stabilizing



force during change and Blumer's (1969) Symbolic Interactionism, in which meaning emerges from interaction. In essence, digital transformation operates as a socially constructed process. Technology introduces possibilities, but people define and sustain its meaning through interaction and adaptation.

From a managerial perspective, the study underscores that technology alone does not transform organizations; people do. Leadership engagement, transparent communication, and continuous upskilling are crucial for sustaining innovation. Creating psychologically safe environments where employees can experiment without fear of failure encourages creativity and accelerates adoption. Regulators such as Bank Indonesia and the Otoritas Jasa Keuangan (OJK) should consider human and cultural readiness when designing digitalization policies to ensure inclusivity and long-term trust in the banking ecosystem.

The study introduces the concept of Adaptive Organizational Synergy, a substantive theory explaining how leadership, culture, and human interaction collectively sustain digital transformation.

This theory bridges the gap between diffusion and organizational learning perspectives, reframing innovation as both a technological and socio-cultural process. Through the Grounded Theory approach, the study demonstrates how innovation evolves through negotiation, learning, and meaning construction within organizational contexts. The transformation of Indonesia's banking sector reflects an ongoing interplay among technology, organization, and people. The study's findings affirm that innovation sustainability depends on adaptive learning and trust-based collaboration, not on technological sophistication alone. This human-centered model provides both theoretical insight and practical guidance for achieving resilient and inclusive digital transformation in emerging financial systems.

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