

Digital Transformation and Enterprise Management Efficiency: Challenges, Paths, and Practical Implications

Na Li *

SouthWest Petroleum University, Chengdu, China

*Corresponding Author: Na Li

ABSTRACT

In the context of the rapidly evolving digital economy, digital transformation has emerged as a critical strategic priority for enterprises seeking to enhance management efficiency and sustain competitive advantage. Despite the growing recognition of its importance, many enterprises continue to struggle with effectively integrating digital technologies into their management systems, resulting in significant gaps between technological investment and actual management outcomes. This paper examines the relationship between digital transformation and enterprise management efficiency from the perspective of business administration. By employing literature analysis and theoretical discussion, this study systematically investigates how digital transformation influences key management dimensions, including information transmission, resource allocation, decision-making quality, and organizational flexibility. Furthermore, the paper identifies five major challenges that enterprises encounter during digital transformation, namely, the lack of a clear digital strategy, insufficient digital talents and capabilities, organizational resistance and cultural barriers, weak data governance and information security, and the imbalance between technology investment and management return. On this basis, a set of practical paths is proposed to guide enterprises in improving management efficiency through digital transformation, encompassing strategic planning, talent development, organizational optimization, data governance enhancement, and performance evaluation mechanism construction. The findings suggest that digital transformation, when effectively aligned with management innovation, can substantially improve enterprise management efficiency and support sustainable organizational development. This study contributes to the existing literature by offering an integrated framework that connects digital transformation practices with concrete management improvement strategies, providing practical implications for both enterprise managers and economic management researchers.

KEYWORDS

Digital transformation; Enterprise management; Management efficiency; Business administration; Economic management

1. INTRODUCTION

1.1. Research Background

The rapid advancement of digital technologies, including big data, cloud computing, artificial intelligence, and the Internet of Things, has profoundly reshaped the global business environment. Enterprises across various industries are facing unprecedented pressures to adapt to the demands of the digital economy, in which information flows faster, markets change more dynamically, and customer expectations continue to rise (Shahbaz et al., 2019). In response to these challenges, digital transformation has become one of the most important strategic initiatives for modern enterprises. It

is no longer regarded merely as a technological upgrade but is increasingly understood as a comprehensive reorganization of business processes, organizational structures, management models, and value creation mechanisms (Verhoef et al., 2021).

Within this broader context, enterprise management efficiency has received growing scholarly and practical attention. Management efficiency refers to the degree to which an enterprise can achieve its organizational goals by optimally allocating resources, processing information, coordinating operations, and making timely and well-informed decisions. High management efficiency enables enterprises to respond swiftly to market changes, control operational costs, and maintain stable growth. Conversely, low management efficiency leads to resource waste, delayed decision-making, poor coordination, and ultimately reduced organizational performance. The intersection of digital transformation and enterprise management efficiency therefore represents a particularly important and timely research area. While digital transformation holds considerable promise for improving management efficiency, its actual impact depends heavily on how well enterprises align digital tools with management practices, human resources, organizational culture, and governance structures. Many enterprises have invested substantial resources in digital infrastructure yet have not achieved the expected management improvements, indicating that the relationship between digital transformation and management efficiency is more complex than it might initially appear (Brock & von Wangenheim, 2019).

1.2. Research Problem

Against this background, this paper addresses three core research questions. First, how does digital transformation theoretically influence enterprise management efficiency across multiple dimensions? Second, what are the major challenges that enterprises encounter when attempting to improve management efficiency through digital transformation? Third, what practical paths and management strategies can help enterprises overcome these challenges and realize the full potential of digital transformation for management efficiency improvement?

1.3. Research Purpose and Significance

The primary purpose of this paper is to develop a systematic theoretical understanding of the relationship between digital transformation and enterprise management efficiency, and to translate this understanding into actionable management guidance. From a theoretical perspective, this study enriches the existing literature by constructing a multi-dimensional analytical framework that connects digital transformation mechanisms with management efficiency outcomes. From a practical perspective, the paper provides enterprise managers with clear and structured recommendations for navigating the challenges of digital transformation and optimizing management performance. This research holds particular significance for enterprises in transitional stages of digital adoption, where the need for concrete management guidance is greatest. It also contributes to the broader field of economic management by highlighting the importance of integrating management innovation with technological investment, a perspective that has been relatively underexplored in existing studies (Correani et al., 2020).

1.4. Research Method

This paper primarily employs three research methods. First, literature analysis is used to review and synthesize existing research on digital transformation and enterprise management efficiency, establishing the theoretical foundation of the study. Second, inductive analysis is applied to identify common patterns and challenges from the existing literature and management practice. Third, theoretical discussion is used to develop the analytical framework and derive practical management implications.

1.5. Structure of the Paper

The remainder of this paper is organized as follows. Section 2 reviews the existing literature on digital transformation and enterprise management efficiency and identifies the research gap. Section 3 provides a theoretical analysis of how digital transformation influences management efficiency across four key dimensions. Section 4 examines the major challenges enterprises face during digital transformation. Section 5 proposes practical paths for improving enterprise management efficiency. Section 6 presents the conclusions, practical implications, and directions for future research.

2. LITERATURE REVIEW

2.1. Research on Digital Transformation

Digital transformation has attracted extensive scholarly attention in recent years, with researchers approaching the concept from a variety of theoretical and disciplinary perspectives. At its most fundamental level, digital transformation is defined as the process by which organizations integrate digital technologies into all areas of their operations, fundamentally changing how they function and deliver value to stakeholders. This definition emphasizes that digital transformation is not merely about adopting new technologies but involves a profound organizational and strategic change that touches every aspect of how enterprises create and capture value.

Digital transformation encompasses multiple levels of organizational change, including the transformation of individual business functions, entire business models, and broader business ecosystems. These multi-level perspectives highlight the complexity and scope of digital transformation as a management challenge that requires coordinated action across organizational boundaries. Similarly, digital transformation is reshaping competitive dynamics across industries, forcing enterprises to fundamentally reconsider how they organize their management systems, allocate resources, and build organizational capabilities in the digital age (Kraus et al., 2021).

From a strategic management standpoint, researchers have consistently emphasized that successful digital transformation is fundamentally a strategic and managerial challenge rather than a purely technological one. Enterprises that focus exclusively on technology adoption without simultaneously redesigning their management systems and organizational cultures are unlikely to achieve sustainable transformation outcomes. This insight is particularly relevant to understanding the relationship between digital transformation and management efficiency, as it underscores the importance of aligning technological investments with management process improvements. In the broader global business context, digital transformation has been closely linked to improvements in organizational performance, innovation capacity, and competitive resilience (Hanelt et al., 2021). However, research has also demonstrated that many enterprises, particularly those with limited digital maturity, face significant barriers in translating digital investment into tangible management and performance improvements.

2.2. Research on Enterprise Management Efficiency

Enterprise management efficiency has been studied from multiple perspectives in the management and economics literature. At a broad level, management efficiency encompasses the ability of an enterprise to achieve organizational objectives with minimum resource consumption, optimally utilizing human, financial, material, and informational resources. Researchers have identified several key dimensions of management efficiency, including information processing efficiency, decision-making efficiency, resource allocation efficiency, and organizational coordination efficiency, each of which contributes to overall enterprise performance in distinct ways.

Recent studies have increasingly examined how digital technologies influence these dimensions of management efficiency. Digital technology adoption significantly improves operational efficiency by automating routine management tasks, reducing processing time, and minimizing human error in management processes. The integration of digital tools into management workflows enables enterprises to handle larger volumes of management information with greater accuracy and speed, creating a foundation for more effective organizational governance. Similarly, research on artificial intelligence applications in enterprise management has shown that advanced analytics capabilities can substantially enhance decision-making efficiency by providing managers with more timely, accurate, and comprehensive analytical support for complex management decisions (Plastino & Purdy, 2018).

Resource allocation efficiency has also been identified as a critical dimension of management performance that digital transformation can meaningfully improve. Enterprises with advanced digital management capabilities are better able to monitor resource utilization in real time, identify allocation inefficiencies, and dynamically reallocate resources in response to changing organizational needs. Organizational coordination efficiency, another key management efficiency dimension, has been shown to benefit significantly from digital collaboration platforms and integrated enterprise management systems that reduce coordination costs and improve cross-functional alignment across organizational boundaries.

2.3. Research Gap and Contribution of This Paper

While both digital transformation and enterprise management efficiency have been extensively studied as separate topics, the existing literature reveals a notable gap in research that systematically connects the two concepts within an integrated analytical framework. Most existing studies on digital transformation focus primarily on its effects on financial performance, innovation output, or competitive advantage, without providing a detailed analysis of the specific mechanisms through which digital transformation influences management efficiency. Meanwhile, studies on management efficiency tend to treat digital technology as one of many influencing factors without deeply exploring the transformative potential of comprehensive digital transformation initiatives (Li et al., 2018).

Furthermore, while some studies have identified challenges in digital transformation, they often focus on technological or financial barriers rather than examining the management-specific obstacles that prevent enterprises from achieving efficiency improvements. Similarly, the existing literature offers limited practical guidance for enterprise managers on how to systematically optimize management efficiency as part of their digital transformation strategies. This paper addresses these gaps by constructing a comprehensive framework that analyzes the multi-dimensional theoretical impact of digital transformation on management efficiency, systematically identifies the management-specific challenges in digital transformation, and proposes integrated practical paths that link digital transformation strategies with concrete management efficiency improvements. In doing so, this study provides both theoretical contributions and practical implications that advance the understanding of digital transformation as a management efficiency improvement tool.

3. THEORETICAL ANALYSIS OF DIGITAL TRANSFORMATION AND MANAGEMENT EFFICIENCY

3.1. Improvement of Information Transmission Efficiency

One of the most direct and significant ways in which digital transformation improves enterprise management efficiency is through the enhancement of information transmission. In traditional management systems, information flows through hierarchical channels, often resulting in delays, distortions, and information asymmetry between different organizational levels and departments. This

inefficiency in information transmission leads to slower decision-making, misaligned resource allocation, and reduced overall management effectiveness. Digital transformation addresses these problems by creating integrated information platforms that enable real-time data collection, processing, and sharing across the entire organization. Enterprise resource planning systems, digital collaboration platforms, and data analytics tools allow information to flow rapidly and accurately between departments, management levels, and even between enterprises and their external stakeholders. This real-time information sharing significantly reduces the time lag between the occurrence of management-relevant events and the organizational response, thereby improving the speed and quality of management actions.

3.2. Optimization of Resource Allocation

Digital transformation also contributes to management efficiency through the optimization of resource allocation. In traditional management environments, resource allocation decisions are often based on historical data, managerial experience, and subjective judgment, which can lead to resource misallocation, waste, and suboptimal management outcomes. Digital transformation provides enterprises with powerful tools for data-driven resource management, enabling more precise and dynamic allocation of human, financial, and material resources across different organizational units and activities.

Advanced data analytics capabilities allow enterprises to gain deeper insights into the performance and utilization of resources across different business units, projects, and time periods. By analyzing large volumes of operational data, managers can identify inefficiencies, reallocate resources to higher-value activities, and optimize overall resource utilization patterns. This data-driven approach to resource management reduces waste, lowers operational costs, and improves the return on management investment. Furthermore, digital platforms enable more flexible and responsive resource allocation mechanisms that can adapt quickly to changing business conditions. Cloud-based resource management systems allow enterprises to scale resources up or down rapidly in response to dynamic business needs, improving operational agility and management efficiency. The ability to allocate resources dynamically in response to real-time data represents a significant improvement over traditional static resource allocation approaches, with direct positive implications for overall enterprise management efficiency and competitive performance.

3.3. Enhancement of Decision-Making Quality

Digital transformation has a profound impact on the quality of management decision-making, another critical dimension of enterprise management efficiency. Traditional decision-making processes rely heavily on managerial experience, intuition, and incomplete information, which can result in suboptimal decisions, particularly in complex and rapidly changing business environments. Digital transformation fundamentally changes the decision-making environment by providing managers with access to large volumes of high-quality data, advanced analytical tools, and real-time market intelligence that support more informed and effective management judgments.

Big data analytics and business intelligence systems enable enterprises to analyze complex patterns in customer behavior, market trends, operational performance, and competitive dynamics, providing a more comprehensive and accurate basis for management decisions. Artificial intelligence and machine learning technologies further enhance decision support capabilities by enabling predictive analytics, automated risk assessment, and scenario simulation, which allow managers to anticipate future challenges and opportunities more effectively. The improvement in decision-making quality resulting from digital transformation has direct implications for management efficiency. When decisions are based on better information and more rigorous analysis, the likelihood of costly errors decreases, the allocation of resources becomes more effective, and the strategic direction of the enterprise becomes more clearly defined. This improvement in decision quality also reduces the time

and effort required to correct management mistakes, freeing up organizational resources for value-creating activities and contributing to sustained management efficiency gains over time.

3.4. Promotion of Organizational Flexibility

A fourth important mechanism through which digital transformation improves management efficiency is the promotion of organizational flexibility. Organizational flexibility refers to the ability of an enterprise to adapt its structure, processes, and resources in response to changes in the internal and external business environment. In a highly dynamic and competitive digital economy, organizational flexibility is a critical determinant of management effectiveness and long-term enterprise performance, enabling organizations to respond proactively to emerging opportunities and threats.

Digital transformation promotes organizational flexibility through several interconnected mechanisms. First, digital communication and collaboration platforms reduce the constraints of physical location and organizational hierarchy, enabling more fluid and responsive organizational configurations that can adapt quickly to changing management demands. Flat organizational structures enabled by digital technologies facilitate faster information sharing and decision-making, reducing bureaucratic delays that typically impair management efficiency in traditional hierarchical organizations. Second, digital process automation frees employees and managers from routine tasks, allowing them to focus on higher-value activities that require creativity, judgment, and strategic thinking. This reallocation of human capital within the organization improves overall management quality and supports continuous organizational learning and adaptation. Third, digital platforms enable enterprises to build more agile management systems that can respond quickly to market changes, customer demands, and competitive pressures, enhancing overall management efficiency in dynamic business environments.

Table 1 summarizes the main effects of digital transformation on enterprise management efficiency across the four dimensions discussed above.

Table 1. Main Effects of Digital Transformation on Enterprise Management Efficiency

Dimension	Traditional Management	Digital Management	Expected Result
Information flow	Slow and fragmented	Real-time and integrated	Faster and more accurate communication
Resource allocation	Experience-based and static	Data-driven and dynamic	Higher resource utilization efficiency
Decision-making	Intuition-dependent	Analytics-supported	Better decision quality and lower error rate
Organizational flexibility	Hierarchical and rigid	Flat and agile	Faster response to environmental changes

4. MAJOR CHALLENGES IN ENTERPRISE DIGITAL TRANSFORMATION

4.1. Lack of Clear Digital Strategy

Despite the well-documented benefits of digital transformation for management efficiency, many enterprises struggle to realize these benefits in practice. One of the most fundamental challenges is the lack of a clear and coherent digital transformation strategy. Without a well-defined strategic vision, digital transformation efforts tend to be fragmented, reactive, and poorly aligned with overall organizational goals, preventing enterprises from achieving the systematic management efficiency improvements that comprehensive digital transformation can deliver.

In many enterprises, digital initiatives are launched in response to short-term competitive pressures or imitative behavior rather than as part of a systematic strategy for long-term value creation. This approach leads to a proliferation of disconnected digital tools and systems that fail to generate synergistic management improvements. When digital transformation lacks strategic coherence, investments in technology do not translate into corresponding improvements in management processes, resulting in wasted resources and missed opportunities for efficiency gains. Furthermore, the absence of a clear digital strategy makes it difficult for enterprises to prioritize digital investments, measure transformation progress, and align the efforts of different organizational units toward common digital goals. This lack of strategic direction undermines management coordination and reduces the overall effectiveness of digital transformation as a tool for management efficiency improvement, creating a gap between the theoretical potential of digital technologies and their actual impact on organizational performance.

4.2. Insufficient Digital Talents and Capabilities

A second major challenge in enterprise digital transformation is the shortage of digital talents and organizational digital capabilities. Effective digital transformation requires personnel who possess not only technical skills in areas such as data analytics, software development, and digital system management, but also strong management capabilities and deep understanding of business processes. The combination of technical expertise and management knowledge is rare and difficult to develop quickly, creating a significant talent gap that constrains the ability of many enterprises to implement effective digital transformation programs.

This shortage of digital talent affects management efficiency in several important ways. Without sufficient technical expertise, enterprises are unable to fully exploit the management improvement potential of digital tools and systems. Without management-oriented digital capabilities, technology investments may generate data and automation without being effectively translated into improved management practices. The talent gap can also slow the pace of digital transformation implementation, delaying the realization of management efficiency improvements and increasing transformation costs and organizational uncertainty. The challenge of digital talent development is further compounded by the rapid pace of technological change, which requires continuous learning and skill updating across all organizational levels. Enterprises that fail to invest adequately in digital talent development risk falling behind in the digital transformation process, with direct negative consequences for management efficiency and competitive performance. Human capital development is one of the most significant predictors of successful digital transformation outcomes, suggesting that talent investment should be treated as a strategic priority rather than a secondary concern in enterprise digital transformation planning.

4.3. Organizational Resistance and Cultural Barriers

Organizational resistance and cultural barriers represent a third major challenge to digital transformation and management efficiency improvement. Digital transformation involves significant changes to established workflows, management practices, power relationships, and organizational routines, all of which can generate resistance from employees and managers at various organizational levels. This resistance is not simply irrational obstruction but often reflects legitimate concerns about the disruption of established competencies, role redefinitions, and uncertainty about future organizational arrangements that digital transformation inevitably produces.

Employees who are accustomed to traditional management practices may perceive digital transformation as a threat to their established competencies, role definitions, or job security. This perception can lead to passive or active resistance to new digital tools and processes, reducing adoption rates and undermining the management efficiency gains that digital transformation is intended to deliver. Similarly, middle managers who exercise authority within traditional

management hierarchies may resist digital transformation initiatives that redistribute decision-making power or increase transparency in ways that challenge their established roles and influence. Cultural barriers also play an important role in impeding digital transformation progress. Organizational cultures that emphasize risk aversion, hierarchical control, and adherence to established procedures may be poorly suited to the agile, data-driven, and collaborative management approaches that effective digital transformation requires. Changing deeply embedded organizational cultures is a slow and complex process that requires sustained leadership commitment and carefully designed change management interventions. Cultural alignment is one of the most critical success factors in enterprise digital transformation, with organizations that proactively address cultural barriers achieving significantly better management efficiency outcomes than those that focus exclusively on technological implementation.

4.4. Data Governance and Information Security Problems

The fourth major challenge concerns data governance and information security. Digital transformation generates and relies upon enormous volumes of data, making effective data governance a critical prerequisite for management efficiency improvement. However, many enterprises lack the data governance frameworks, standards, and processes needed to ensure data quality, consistency, accessibility, and security across their digital management systems. This governance deficit undermines the information quality on which data-driven management decisions depend, limiting the actual management efficiency improvements that digital transformation can deliver.

Poor data governance leads to data silos, where information is stored in isolated systems that cannot communicate effectively with each other, preventing the enterprise from gaining a unified view of its operations and performance. Data quality problems, including inaccuracies, inconsistencies, and incompleteness, undermine the reliability of analytics and reporting systems, reducing the quality of data-driven management decisions. Without strong data governance, the information transmission and decision-making improvements that digital transformation is intended to deliver cannot be fully realized, creating a fundamental disconnect between digital investment and management efficiency outcomes. Information security presents an additional and increasingly serious challenge as enterprises digitize their management systems. Storing sensitive operational, financial, and customer data in digital formats creates vulnerability to cybersecurity threats, data breaches, and system disruptions that can significantly impair management effectiveness and organizational continuity. These security risks not only threaten enterprise operations directly but also create legal, regulatory, and reputational risks that can undermine management credibility and stakeholder confidence. Enterprises undergoing digital transformation must treat data security not as an afterthought but as a foundational management priority, integrating security considerations into every stage of the digital transformation process to ensure that management efficiency gains are not eroded by security vulnerabilities.

4.5. Imbalance Between Technology Investment and Management Return

The fifth major challenge is the persistent imbalance between the substantial financial investments that digital transformation requires and the actual management efficiency returns that enterprises achieve. Many enterprises have invested heavily in digital infrastructure, enterprise software systems, and digital transformation programs, only to find that these investments have not generated proportionate improvements in management efficiency or organizational performance. This investment-return imbalance represents one of the most frustrating and costly challenges in enterprise digital transformation management.

This imbalance typically arises from several interrelated factors. First, enterprises often focus excessively on technology procurement and deployment without simultaneously redesigning

management processes to take full advantage of digital capabilities. Technology alone cannot improve management efficiency if underlying management processes remain poorly designed or misaligned with organizational goals. Second, enterprises may underestimate the time, organizational change effort, and capability development required to achieve meaningful management efficiency improvements from digital transformation, leading to unrealistic expectations and premature assessments of transformation outcomes. Third, the absence of robust performance evaluation mechanisms for digital transformation initiatives makes it difficult for enterprises to measure actual management efficiency improvements, identify underperforming investments, and redirect resources toward higher-value transformation activities. This measurement gap perpetuates ineffective digital investment patterns and prevents enterprises from learning systematically from their digital transformation experience. Enterprises need to develop more sophisticated value realization frameworks for digital transformation that explicitly connect technology deployment with management process redesign and capability development, rather than treating technology investment as an end in itself.

5. PRACTICAL PATHS FOR IMPROVING ENTERPRISE MANAGEMENT EFFICIENCY

5.1. Formulating a Clear Digital Transformation Strategy

The foundation for improving enterprise management efficiency through digital transformation is the development of a clear, coherent, and comprehensive digital transformation strategy. A well-designed strategy provides the overarching direction and priorities that guide all subsequent transformation activities, ensuring that digital investments are consistently aligned with management improvement goals and broader organizational objectives. Without this strategic foundation, digital transformation efforts are likely to remain fragmented and ineffective, regardless of the scale of technology investment.

An effective digital transformation strategy should begin with a thorough assessment of the enterprise's current management capabilities, digital maturity level, and specific management efficiency gaps. This assessment provides the factual basis for identifying priority areas for digital intervention and establishing realistic transformation goals that reflect the enterprise's actual starting point and resource constraints. The strategy should then define a phased implementation roadmap that specifies the sequence of digital initiatives, the resources required at each stage, the management changes needed to support technology adoption, and the milestones that will indicate successful progress toward management efficiency improvement. Critically, the digital transformation strategy should be developed through a participatory process that engages key stakeholders from across the organization, including business unit managers, technology specialists, human resource professionals, and frontline employees. This inclusive approach helps to build organizational ownership of the transformation strategy, increases the likelihood of successful implementation, and ensures that the strategy reflects the actual management needs and challenges of different organizational units. Enterprises which integrate digital strategy formulation with systematic management process redesign achieve significantly higher management efficiency improvements than those that treat strategy development and process optimization as separate and sequential activities, highlighting the importance of a holistic and integrated approach to digital transformation strategy.

5.2. Strengthening Digital Talent Development

Addressing the digital talent challenge requires a sustained and multi-faceted investment in human capital development that spans all organizational levels and functional areas. Enterprises should establish comprehensive digital talent development programs that address skill needs from frontline employees to senior management, recognizing that effective digital transformation requires not only

technical proficiency but also management-oriented digital capabilities. These programs should cover both technical digital skills, such as data analysis, digital tool utilization, and process automation management, as well as management-oriented competencies, such as data-driven decision-making, digital leadership, and organizational change management.

Training programs should be designed to be practical, job-relevant, and continuously updated to reflect the rapidly evolving technological landscape. Enterprises should also consider creating structured career pathways for digital talent, providing clear incentives for employees to invest in developing their digital capabilities and contributing to organizational digital transformation goals. Additionally, mentoring programs that pair technically skilled employees with experienced managers can help build the integrated technical and management capabilities that effective digital transformation requires, bridging the gap between technological expertise and management practice. Beyond internal talent development, enterprises should pursue strategic recruitment of external digital talent, including professionals with backgrounds in data science, digital management, enterprise systems integration, and technology strategy. Building partnerships with universities, technology companies, and industry associations can also help enterprises access digital talent pipelines and knowledge resources that support management efficiency improvement through digital transformation. Enterprises with higher levels of digital talent density across both technical and management functions achieve faster and more sustained management efficiency improvements from their digital transformation investments, underscoring the strategic importance of comprehensive talent development as a core component of any effective digital transformation program.

5.3. Optimizing Organizational Structure and Internal Coordination

To fully realize the management efficiency potential of digital transformation, enterprises need to carefully align their organizational structures and internal coordination mechanisms with the demands and opportunities of a digital management environment. This requires moving deliberately away from rigid hierarchical structures that impede information flow and slow decision-making toward more flexible, collaborative, and data-transparent organizational configurations that support agile management practices. Such structural transformation is essential for ensuring that the efficiency improvements enabled by digital technologies are not constrained by organizational designs that were created for a pre-digital management context.

Enterprises should consider restructuring their organizations to create cross-functional digital management teams that integrate technology, business, and management expertise, enabling more effective coordination across traditional organizational boundaries. These teams can serve as centers of digital management excellence, driving adoption of digital tools and processes across the organization while ensuring that technology deployment is consistently aligned with management efficiency objectives. Enterprises which establish dedicated digital transformation governance structures, including cross-functional coordination mechanisms and clear digital management accountability frameworks, achieve more coherent and efficient digital transformation outcomes than those that rely on informal or ad hoc implementation approaches. Internal coordination mechanisms should also be systematically redesigned to leverage digital platforms for collaboration and communication across departmental boundaries. Implementing integrated digital workflow management systems, virtual collaboration platforms, and real-time performance dashboards can significantly improve the speed and quality of cross-departmental coordination, reducing management delays and improving overall organizational responsiveness to internal and external demands. These coordination improvements translate directly into higher management efficiency and better organizational performance by eliminating the friction and delays that characterize poorly coordinated management systems.

5.4. Improving Data Governance and Risk Control

Effective data governance is a foundational enabler of management efficiency improvement through digital transformation, without which the data-driven management improvements that digital transformation promises cannot be sustainably realized. Enterprises should establish formal data governance frameworks that define clear standards, responsibilities, and processes for data collection, storage, processing, sharing, and utilization across all organizational functions and management levels. These frameworks should specify data quality requirements, establish data stewardship roles and accountability mechanisms, and create systematic processes for ongoing data quality monitoring and continuous improvement.

Addressing data silo problems requires implementing integrated data management platforms that enable seamless data sharing across different business units and management functions, breaking down the information barriers that prevent enterprises from developing a unified and accurate picture of their operations and performance. Enterprises should invest in data infrastructure that supports real-time analytics and management reporting, providing decision-makers at all levels with timely and accurate information for effective management action. Standardizing data definitions and formats across the organization is a particularly important step in ensuring that data generated in different parts of the enterprise can be effectively integrated and used for management decision-making purposes. Information security management should be treated as an integral and non-negotiable component of the digital transformation strategy, rather than as a separate technical consideration to be addressed after other transformation priorities. Enterprises should implement comprehensive cybersecurity frameworks that protect digital management systems and data assets from unauthorized access, theft, disruption, and misuse. Regular security assessments, enterprise-wide employee cybersecurity training, and sustained investment in security monitoring and incident response capabilities are essential elements of a robust digital risk management approach. Enterprises adopt a proactive rather than reactive approach to digital risk management, integrating security and governance capabilities into the design of digital management systems from the outset rather than attempting to retrofit security measures after digital deployment has already occurred.

5.5. Building a Management Performance Evaluation Mechanism

Finally, enterprises must establish robust and comprehensive performance evaluation mechanisms specifically designed to measure, track, and communicate management efficiency improvements resulting from digital transformation initiatives. These mechanisms provide the essential feedback loops that enable enterprises to learn systematically from their digital transformation experience, identify both high-performing and underperforming transformation activities, and continuously optimize their management efficiency enhancement strategies based on empirical evidence rather than assumptions.

Performance evaluation mechanisms for digital transformation should incorporate both quantitative and qualitative indicators that collectively capture the multiple dimensions of management efficiency improvement identified in this paper. Quantitative indicators should include metrics such as information processing time, decision cycle time, resource utilization rates, cross-departmental coordination efficiency scores, operational error rates, and digital tool adoption rates across the organization. Qualitative indicators should encompass assessments of decision-making quality, management process flexibility, organizational adaptability, and employee digital capability development. Together, these complementary indicator types provide a comprehensive picture of digital transformation progress and its impact on management efficiency across all key dimensions. Evaluation results should be reviewed regularly by senior management and used as the basis for evidence-based strategic adjustments to the digital transformation roadmap and management improvement priorities. Enterprises should also use performance evaluation data to systematically identify and document best practices in digital management efficiency improvement, enabling the

deliberate sharing and scaling of successful approaches across different organizational units. By building an organizational culture of data-driven management performance evaluation and continuous improvement, enterprises can ensure that their digital transformation investments generate not only immediate management efficiency gains but also sustained and self-reinforcing improvements in organizational management capability over the long term. Enterprises which implement structured digital transformation performance evaluation systems demonstrate significantly higher rates of management efficiency improvement and digital transformation success than those that rely on informal or ad hoc assessment approaches, highlighting the critical importance of systematic performance evaluation as a management efficiency improvement mechanism.

6. CONCLUSION

6.1. Main Findings

This paper has systematically examined the relationship between digital transformation and enterprise management efficiency from the perspective of business administration, addressing three core research questions concerning the mechanisms of impact, the major challenges enterprises face, and the practical management improvement paths available to address these challenges. The theoretical analysis conducted in Section 3 demonstrates that digital transformation can improve enterprise management efficiency through four main and complementary mechanisms: the improvement of information transmission efficiency, the optimization of resource allocation, the enhancement of decision-making quality, and the promotion of organizational flexibility. Each of these mechanisms contributes to management efficiency improvement in distinct ways, and their combined impact suggests that enterprises which pursue comprehensive and strategically coherent digital transformation will achieve substantially greater management efficiency gains than those that adopt selective or fragmented approaches to digital technology deployment.

The analysis of major challenges presented in Section 4 reveals that the path from digital investment to management efficiency improvement is neither automatic nor straightforward. Enterprises face five interconnected challenges, including strategic ambiguity, talent deficits, organizational resistance, data governance weaknesses, and investment-return imbalances, each of which can significantly impair the ability of digital transformation to generate the management efficiency gains it theoretically promises. These challenges are mutually reinforcing in important ways: strategic ambiguity limits talent development direction, talent deficits impede effective technology utilization, organizational resistance undermines process redesign, data governance weaknesses reduce information quality, and the absence of performance evaluation mechanisms perpetuates ineffective investment patterns. Enterprises must therefore address these challenges in a coordinated and integrated manner rather than treating them as separate and independent problems.

The practical paths proposed in Section 5 provide a structured and actionable response to these challenges, organizing management improvement strategies around five mutually reinforcing pillars: strategic clarity, talent development, organizational optimization, data governance, and performance evaluation. Together, these five pillars constitute an integrated management framework for digital transformation that addresses both the enabling conditions and the implementation mechanisms required for sustained and measurable management efficiency improvement.

6.2. Practical Implications

The findings of this paper carry several important practical implications for enterprise managers, organizational leaders, and policymakers concerned with enterprise digital transformation and management efficiency. For enterprise managers, the most important implication is that digital transformation must be approached fundamentally as a management transformation initiative rather than simply as a technology investment program. The success of digital transformation in improving

management efficiency depends critically not only on the quality and scale of technology investment but equally on the quality of strategic planning, the depth and breadth of talent development, the coherence of organizational redesign, the rigor of data governance, and the sophistication of performance evaluation mechanisms. Enterprises that invest systematically in all of these management dimensions alongside their technological infrastructure will be significantly better positioned to achieve sustainable management efficiency improvements than those that focus primarily on technology acquisition and deployment while neglecting the complementary management investments required for transformation success.

For policymakers and industry associations, the findings suggest that effectively supporting enterprise digital transformation requires policy frameworks and support programs that go well beyond providing financial incentives for technology investment. Equally important is the provision of accessible management education resources, digital talent development infrastructure, industry data governance standards, and practical performance evaluation frameworks that help enterprises build the management capabilities needed to translate digital technology investments into genuine and sustained management efficiency improvements.

6.3. Research Limitations and Future Directions

This study is subject to several limitations that should be clearly acknowledged. First, the paper relies primarily on literature analysis and theoretical discussion, without direct empirical validation of the proposed framework through quantitative data collection or systematic case studies. Future research should test the relationships and propositions identified in this paper using rigorous empirical methods, including large-sample surveys, longitudinal performance data analysis, or in-depth comparative case studies of enterprises at different stages of digital transformation and management efficiency development.

Second, the analysis in this paper is conducted at a relatively general level, without differentiating systematically between different industries, enterprise sizes, ownership structures, or national and cultural contexts. Future research could examine how the relationship between digital transformation and management efficiency varies across these different contextual dimensions, providing more nuanced, tailored, and context-specific guidance for enterprise managers facing particular industry or organizational challenges.

Third, while this paper focuses primarily on the internal management dimensions of digital transformation, future research could extend the analytical scope to examine how digital transformation influences management efficiency in inter-organizational settings, including supply chain management, strategic alliance governance, platform ecosystem management, and cross-border business coordination. Such extensions would provide a more comprehensive and externally oriented understanding of the management efficiency implications of digital transformation in the increasingly interconnected and digitally mediated contemporary business environment.

REFERENCES

- [1] Brock, J. K.-U., & von Wangenheim, F. (2019). Demystifying AI: What Digital Transformation Leaders Can Teach You about Realistic Artificial Intelligence. *California Management Review*, 61(4), 110–134.
- [2] Correani, A., De Massis, A., Frattini, F., Petruzzelli, A. M., & Natalicchio, A. (2020). Implementing a Digital Strategy: Learning from the Experience of Three Digital Transformation Projects. *California Management Review*, 62(4), 37–56.
- [3] Hanelt, A., Bohnsack, R., Marz, D., & Antunes, C. (2021). A Systematic Review of the Literature on Digital Transformation: Insights and Implications for Strategy and Organizational Change. *Journal of Management Studies*, 58(5), 1159–1197.

- [4] Kraus, S., Jones, P., Kailer, N., Weinmann, A., Banegas, N. C., & Tierno, N. R. (2021). Digital Transformation: an Overview of the Current State of the Art of Research. *SAGE Open*, 11(3), 1–15.
- [5] Li, L., Su, F., Zhang, W., & Mao, J.-Y. (2018). Digital transformation by SME entrepreneurs: A capability perspective. *Information Systems Journal*, 28(6), 1129–1157.
- [6] Plastino, E., & Purdy, M. (2018). Game changing value from Artificial Intelligence: eight strategies. *Strategy & Leadership*, 46(1), 16–22.
- [7] Shahbaz, M., Gao, C., Zhai, L., Shahzad, F., & Hu, Y. (2019). Investigating the adoption of big data analytics in healthcare: the moderating role of resistance to change. *Journal of Big Data*, 6(1).
- [8] Verhoef, P. C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Qi Dong, J., Fabian, N., & Haenlein, M. (2021). Digital transformation: a Multidisciplinary Reflection and Research Agenda. *Journal of Business Research*, 122(122), 889–901.