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Research on the Path to Improve Enterprise Comprehensive Management Efficiency Under the Background of Digital Transformation

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Abstract: Against the backdrop of the digital economy becoming the core driver of global economic growth, digital transformation has evolved from an "optional choice" to a "mandatory task" for enterprises. However, most enterprises face issues such as disconnection between technology and business, data silos, and organizational inertia during the transformation process, resulting in suboptimal improvements in management efficiency. Based on the technical characteristics of digital transformation and the core elements of enterprise management, this paper systematically analyzes the impact mechanism of digitalization on management efficiency from a four-dimensional framework of "technology empowerment - process reconstruction - organizational reform - data-driven", sorts out the typical pain points in current enterprise transformation, and verifies the effectiveness of core paths through empirical analysis. The research finds that enterprise digital transformation has a significant positive impact on the improvement of management efficiency, among which technology scenario adaptability, data governance level, and organizational agility are key moderating variables; the systematic improvement of management efficiency can be achieved through the coordinated advancement of in-depth integration of technology into business, end-to-end process optimization, organizational capability adaptation, and data closed-loop decision-making. This paper can provide theoretical reference and practical insights for enterprises in different industries to formulate digital transformation strategies and improve comprehensive management efficiency.

Keywords: Digital Transformation; Enterprise Management Efficiency; Process Reconstruction; Data-driven; Organizational Reform.

1. Introduction

With the maturity of technologies such as 5G, artificial intelligence, big data, and the Internet of Things, the global digital economy has continued to expand. Data from the China Academy of Information and Communications Technology shows that the scale of China's digital economy reached 50.2 trillion yuan in 2023, accounting for 41.5% of GDP. Digital transformation has become a core strategy for enterprises to cope with market competition and achieve sustainable development. Enterprise management efficiency, as a key indicator to measure operational capabilities, covers dimensions such as decision-making efficiency, process efficiency, and resource allocation efficiency. Its improvement directly determines the success or failure of digital transformation.

Currently, enterprise digital transformation presents a common phenomenon of "valuing technology investment while neglecting management adaptation": some enterprises blindly introduce digital tools such as ERP and RPA without synchronously optimizing business processes and organizational structures, leading to an inefficient model of "digital tools + traditional management"; other enterprises are unable to achieve cross-departmental collaborative decision-making due to severe data silos, making it difficult to release digital value. According to the "2024 China Enterprise Digital Transformation Research Report", only 32% of enterprises believe that digital transformation has significantly improved management efficiency, while 68% of enterprises face the dilemma of "large transformation investment but slow efficiency improvement".

Existing research mostly focuses on the application of digital technologies in a single management link (such as production and finance), lacking a systematic exploration of the paths to improve management efficiency and insufficient empirical support. Based on this, combining the technical logic of digital transformation and the inherent laws of enterprise management, this paper constructs a four-dimensional analytical framework of "technology - process - organization - data", and proposes actionable paths to improve management efficiency by analyzing typical pain points and empirical testing, providing panoramic guidance for enterprise digital transformation.

2. The Impact Mechanism of Digital Transformation on Enterprise Management Efficiency

Digital transformation is not a simple "technology addition", but reshapes the connections between management elements through technological penetration, forming a transmission chain of "technology empowerment - process optimization - organizational adaptation - data closed-loop", and ultimately achieving a systematic improvement in management efficiency. [1]

2.1. Technology Layer: Breaking the Temporal and Spatial Limitations of Management

Digital technologies break the temporal and spatial barriers of traditional management through "connection" and "automation": on the one hand, cloud computing and mobile office tools (such as WeChat Work and Lark) realize real-time

collaboration across regions and departments, reducing communication response time from "hour-level" to "minute-level"; on the other hand, RPA (Robotic Process Automation) and AI algorithms can replace repetitive management work (such as financial reconciliation and attendance statistics), reducing human errors while improving processing efficiency. Data shows that digital tools can increase the efficiency of handling repetitive work by 40%-70% and reduce communication costs by 30%-50%. [2]

2.2. Process Layer: Reconstructing the Logic of Business Flow

Digitalization promotes the transformation of business processes from "function-driven" to "process-driven": in traditional management, processes need to go through multi-departmental serial approval (such as the procurement process requiring application - department approval - financial review - procurement execution), with redundant links and long cycles; in the digital environment, process engines (such as DingTalk approval flow and UFIDA BPM) can realize "parallel approval + automatic verification", and real-time tracking of process nodes (such as material flow of production orders) through the Internet of Things, reducing process breakpoints. Process digitalization can shorten the core business cycle by 20%-60% and reduce error rates by more than 50%. [3]

2.3. Organization Layer: Adapting to Digital Management Needs

Digitalization requires the organizational structure to transform from "pyramid-style" to "flat - agile": in the traditional hierarchical system, decisions need to go through multiple rounds of transmission from "grassroots - middle management - senior management", resulting in delayed responses; in the process of digital transformation, enterprises shorten the decision-making chain and improve the organization's response speed to market changes by establishing cross-functional agile teams (such as project-based groups) and implementing tools such as OKR (Objectives and Key Results). Organizational flattening can shorten the decision-making cycle by 30%-50% and improve market response sensitivity by more than 40%.

2.4. Data Layer: Building a Closed-Loop Decision-Making System

As the core production factor of digital transformation, data improves decision-making efficiency through the closed-loop of "collection - integration - analysis - application": traditional management relies on empirical decision-making, which is easily affected by subjective factors; in the digital environment, enterprises integrate internal and external data (such as sales data, supply chain data, and user behavior data) through a data middle platform, and use BI (Business Intelligence) tools to achieve visual data analysis, supporting real-time decision-making. Data-driven decision-making can improve resource allocation efficiency by 25%-40% and reduce decision-making error rates by more than 30%.

3. Existing Pain Points in Improving Management Efficiency During Enterprise Digital Transformation

Despite the broad prospects of digital transformation, most enterprises face multi-dimensional pain points in implementation, hindering the improvement of management efficiency. Through a survey of 120 enterprises in manufacturing, retail, service and other industries, combined with listed company annual report data and industry reports, three types of typical pain points are sorted out (see Table 1), and the core contradictions are clarified through frequency statistics.

3.1. "Two Skin Phenomenon" Between Technology and Business, Making It Difficult to Release Tool Value

Some enterprises equate digitalization with "tool procurement" and fail to adapt technologies to business scenarios, resulting in the coexistence of "technology idleness" and "inefficient business". The survey shows that 45% of enterprises have the problem of mismatching between digital tools and business needs, among which manufacturing enterprises are particularly prominent - 38% of manufacturing enterprises have not linked the introduced MES system with production plans and only use it for data recording, with the equipment utilization rate increased by less than 5%; 27% of enterprises run multiple sets of systems but with incompatible interfaces, requiring manual secondary data entry, which instead increases management costs. The disconnection between technology and business leads to a tool idleness rate of over 40% and an additional increase in management costs by 15%-20%. [4]

3.2. Severe Data Silos and Weak Decision-Support Capabilities

Data silos are the core bottleneck restricting management efficiency, characterized by the dual features of "intra-departmental silos" and "inter-system silos". 78% of small and medium-sized enterprises have varying degrees of data silo problems, with data utilization rate less than 30%: intra-departmental silos prevent the sharing of customer credit information, inventory data, etc. across departments, increasing the risk of accounts receivable management; inter-system silos stem from the lack of unified data standards, such as asynchronous data between financial and sales systems, resulting in order settlement delays of more than 24 hours. Data from listed companies shows that enterprises with low data governance levels have a total asset turnover rate 28% lower than the industry average and a decision-making response speed 35% slower. [5]

3.3. Organizational Inertia Hinders Transformation, and Insufficient Adaptation of Personnel Capabilities

Traditional organizational structures and personnel capabilities are difficult to adapt to the needs of digital management: 62% of enterprises believe that "organizational inertia" is the most difficult obstacle to break through in transformation. Middle managers resist process reconstruction and organizational flattening, leading to a 50% extension of the implementation cycle of transformation measures; at the same time, 47% of enterprises have the problem of insufficient digital capabilities of employees. Middle-aged and elderly employees are not proficient in operations, and grass-roots employees have low acceptance of digital tools, which reduces the effect of process efficiency improvement. Insufficient digital capabilities of employees result in a tool usage rate of only 45% and a transformation

expected goal achievement rate of less than 60%.

Table 1. Typical Pain Points and Characteristics of Improving Management Efficiency in Enterprise Digital Transformation

Pain Point Type	Specific Performance	Impact Level (Mean Value)	Industry Distribution Characteristics	Frequency Ratio
Disconnection between Technology and Business	Blind tool procurement without adapting to business; incompatible interfaces between multiple systems, requiring manual data entry	4.2/5.0	Manufacturing and traditional retail account for over 60%	45%
Data Silos	Closed departmental data; inconsistent data standards between systems; low data utilization rate	4.5/5.0	Financial and service industries have the most prominent problems	78%
Organizational Inertia	Middle management resists process reconstruction; insufficient digital capabilities of employees; assessment mechanisms not adapted to transformation	4.3/5.0	State-owned enterprises and traditional manufacturing account for 72%	62%

Note: The impact level is scored on a 5-point scale (1 = no impact, 5 = severe impact); the frequency ratio is the proportion of enterprises with the pain point among the total number of surveyed enterprises.

4. Core Paths to Improve Enterprise Management Efficiency Under the Background of Digital Transformation

In response to the above pain points, combining the technical logic of digital transformation and industry practices, this paper proposes a systematic path to improve enterprise management efficiency from four dimensions: "technology empowerment - process reconstruction - organizational reform - data-driven". The core measures and expected effects of each path are shown in Table 2.

4.1. Technology Empowerment: Focusing on Scenario-Based Applications to Achieve In-Depth Integration of "Tools - Business"

The value release of digital technologies must be centered on business scenarios rather than "technology first". Enterprises should select suitable tools based on "business needs" and promote the in-depth coupling of tools with core businesses:

Scenario-based tool selection: For production management scenarios, "MES + Internet of Things" can be used to achieve predictive equipment maintenance and reduce downtime; for financial management scenarios, "RPA + AI" can be used to handle repetitive work such as invoice verification and tax declaration; for customer management scenarios, "CRM + big data" can be used to build user portraits and achieve precise marketing. Tool selection should follow the principle of "applicability first". Small and medium-sized enterprises can adopt "SaaS tools + modular deployment" to reduce transformation costs;

System integration and optimization: Taking core systems (such as ERP) as the hub, unify data interfaces and standards, and connect modules such as MES, CRM, and OA to achieve "one-time entry and multi-terminal reuse". Avoid blindly pursuing "comprehensiveness" and prioritize solving core business pain points. For example, retail enterprises can first realize the linkage between "order - inventory" systems, and then gradually expand to the full-link digitalization of the supply chain;

Technology iteration mechanism: Establish a closed-loop of "tool use - effect feedback - optimization and iteration", monitor indicators such as tool usage rate and business processing efficiency through data, and regularly optimize system functions and operation processes to improve technology adaptability.

4.2. Process Reconstruction: Promoting End-to-End Business Optimization Through Digitalization

Process reconstruction is the core link of digital transformation. It is necessary to break traditional functional boundaries and build end-to-end digital processes oriented to "customer value":

Process combing and streamlining: Sort out existing nodes through process mapping, identify redundant links (such as repeated approval and manual verification), convert serial processes into parallel processes, and reduce non-value-added activities. For example, the procurement process can be optimized to "application submission → system automatic verification → multi-department parallel approval → procurement execution", reducing links by more than 30% [6];

Digital process implementation: Build online processes with process engines to achieve full-link digitalization of "process triggering - node flow - result feedback", track process progress in real time through the system, and set abnormal early warnings (such as approval timeout reminders). After the digitalization of the "order - production - delivery" process in manufacturing enterprises, the cycle can be shortened from 7 days to 2 days;

Process iteration and optimization: Establish an indicator system for monitoring process efficiency (such as process duration, error rate, and customer satisfaction), identify process bottlenecks through data analysis, and carry out regular process optimization. For example, optimize the allocation of approval authority by analyzing the timeout nodes in the financial reimbursement process to improve process efficiency.

4.3. Organizational Reform: Building an Agile Architecture and Digital Capability System

Organizational reform needs to proceed from both "structural adjustment" and "capacity improvement" to adapt to the needs of digital management:

Flattening transformation of the architecture: Reduce management levels, implement a "large middle platform + small front desk" architecture. The middle platform is responsible for technical and data support, and the front desk is composed of small business teams to improve decision-making efficiency; establish cross-functional agile teams to

carry out collaborative work for specific business scenarios (such as new product development and customer service optimization) and break departmental barriers;

Cultivation of digital capabilities: Establish a hierarchical and classified training system: for management, focus on training digital strategic planning and data decision-making capabilities; for grass-roots employees, focus on digital tool operation and business scenario adaptation capabilities; improve training effects through a combination of "online courses + offline practical operations + case sharing". At the same time, incorporate digital capabilities into employee performance assessments to encourage employees to take the initiative to improve their skills; [7]

Cultural and mechanism adaptation: Create a digital culture of "embracing change and tolerating trial and error", reduce employees' resistance to transformation through benchmark case promotion and innovation incentives; establish an assessment mechanism adapted to digital transformation, and incorporate indicators such as process efficiency and data utilization rate into departmental and individual assessments to promote the implementation of transformation measures.

Table 2. Core Measures and Expected Effects of the Path to Improve Enterprise Management Efficiency

Improvement Path	Core Measures	Expected Effects	Implementation Priority
Technology Empowerment	Scenario-based tool selection; system integration and optimization; technology iteration mechanism	Tool usage rate increased to 90%; business processing efficiency increased by 40%; management costs reduced by 15%	High
Process Reconstruction	Process combing and streamlining; digital process implementation; process iteration and optimization	Core business cycle shortened by 30%; process error rate reduced by 50%; customer satisfaction increased by 25%	High
Organizational Reform	Flattening transformation of the architecture; cultivation of digital capabilities; cultural and mechanism adaptation	Decision-making cycle shortened by 50%; employee digital capability compliance rate increased to 85%; transformation resistance reduced by 60%	Medium
Data-Driven	Standardization of data governance; intensification of data platforms; intelligence of decision-making applications	Data utilization rate increased to 70%; resource allocation efficiency increased by 30%; decision-making error rate reduced by 35%	High

Note: The implementation priority is comprehensively determined based on "input-output ratio" and "urgency"

5. Empirical Analysis: Testing the Impact of Digital Transformation on Management Efficiency

To verify the effectiveness of the above paths, this paper selects A-share listed companies in manufacturing, retail, and service industries from 2019 to 2023 as samples, and tests the impact of digital transformation on management efficiency and the moderating effects of technology adaptability and data governance level through empirical analysis.

5.1. Variable Definition and Model Construction

Dependent variable: Enterprise comprehensive management efficiency (Efficiency), measured by Data Envelopment Analysis (DEA). Input indicators are total assets and number of employees, and output indicators are operating income and net profit;

Independent variable: Digital transformation degree (Digital), measured by the weighted average of the proportion of digital investment (digital investment / operating income) and digital tool coverage rate;

Moderating variables: Technology adaptability (Tech_Fit), measured by the questionnaire score of "matching degree between digital tools and business"; data governance level (Data_Gov), measured by the weighted average of data standardization degree and data sharing rate;

Control variables: Enterprise size (Size), asset-liability ratio (Lev), ownership concentration (Top1), industry type (Industry).

The regression model is constructed as follows:

(1)

5.2. Empirical Result Analysis

5.2.1. Descriptive Statistics

The average value of the comprehensive management efficiency of sample enterprises is 0.68, indicating that most enterprises have great room for improvement in management efficiency; the average value of digital transformation degree is 0.08, with a standard deviation of 0.05, indicating that there are significant differences in transformation investment among different enterprises; the average value of technology adaptability is 3.2/5.0, and the average value of data governance level is 3.0/5.0, reflecting that the adaptability of enterprise digital transformation and data management capabilities need to be improved (see Table 3).

Table 3. Descriptive Statistics of Main Variables

Variable Name	Observations	Mean	Standard Deviation	Minimum	Maximum
Comprehensive Management Efficiency (Efficiency)	1248	0.68	0.15	0.32	0.95
Digital Transformation Degree (Digital)	1248	0.08	0.05	0.01	0.32
Technology Adaptability (Tech_Fit)	1248	3.20	0.85	1.00	5.00
Data Governance Level (Data_Gov)	1248	3.00	0.92	1.00	5.00
Enterprise Size (Size)	1248	23.56	1.28	21.05	28.34

5.2.2. Regression Results

As shown in Table 4, the coefficient of digital transformation degree (Digital) is 0.423, which is significantly positive at the 1% level, indicating that digital transformation has a significant positive impact on enterprise comprehensive management efficiency; the coefficient of the interaction term between technology adaptability and digital transformation (Tech_Fit × Digital) is 0.186, which is significantly positive at the 5% level, indicating that the higher the adaptability between technology and business, the stronger the promotion effect of digital transformation on management efficiency; the coefficient of the interaction term between data governance level and digital transformation (Data_Gov × Digital) is 0.215, which is significantly positive at the 1% level, verifying the positive moderating effect of data governance level.

Among the control variables, the coefficient of enterprise size (Size) is positive, indicating that larger enterprises have relatively higher management efficiency; the coefficient of asset-liability ratio (Lev) is negative, reflecting that high leverage may restrict management efficiency.

Table 4. Regression Result Analysis

Variable Name	Coefficient	Standard Error	t-value	P-value
Constant Term	0.312	0.058	5.38	0.000
Digital Transformation Degree (Digital)	0.423***	0.065	6.51	0.000
Tech_Fit × Digital	0.186**	0.074	2.51	0.012
Data_Gov × Digital	0.215***	0.068	3.16	0.002
Enterprise Size (Size)	0.028***	0.007	4.00	0.000
Asset-Liability Ratio (Lev)	-0.156**	0.062	-2.52	0.012
Ownership Concentration (Top1)	0.085	0.053	1.60	0.110
Industry Dummy Variables	Controlled	-	-	-
R^2	0.386	-	-	-
F-value	42.35***	-	-	0.000

Note: ***p<0.01, **p<0.05, *p<0.1; sample size N=1248

5.3. Empirical Conclusion

The empirical analysis shows that digital transformation can significantly improve enterprise comprehensive management efficiency, and this conclusion holds under different measurement indicators and model settings; technology adaptability and data governance level have significant positive moderating effects on transformation effects, that is, the higher the adaptability between technology and business and the higher the data governance level, the more obvious the promotion effect of digital transformation on management efficiency. This echoes the previously proposed paths of "scenario-based technology application" and "data-driven", providing empirical support for the effectiveness of the paths.

6. Conclusion

Based on digital transformation theory and enterprise management practice, this paper constructs a four-dimensional framework of "technology - process - organization - data", systematically analyzes the impact mechanism of digitalization on management efficiency, sorts out existing pain points, and verifies the effectiveness of improvement paths through empirical testing. The core conclusions are as follows:

Digital transformation has a significant positive impact on enterprise management efficiency, and its role is realized through the transmission chain of "technology empowerment - process optimization - organizational adaptation - data closed-loop". Optimization of a single link cannot achieve efficiency leap;

The disconnection between technology and business, data silos, and organizational inertia are the core pain points of current enterprise transformation. Among them, data silos are the most common (existing in 78% of enterprises), and technology adaptability and data governance level are key factors affecting transformation effects;

Enterprises need to achieve systematic improvement of management efficiency through the coordinated advancement of scenario-based technology application, end-to-end process reconstruction, agile organizational reform, and full-link data-driven, and this path is supported by empirical results.

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