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Original Paper

Research on the Connotation, Dilemma and Path of Digital Transformation of Specialized, Sophisticated, Specialized and Innovative Enterprises

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Abstract

The digital transformation of specialized, refined, distinctive, and innovative (SRDI) enterprises has evolved from technological tool upgrades to strategic transformations that restructure core competencies and achieve high-quality sustainable development. This paper systematically defines the concept of "high-quality digital transformation" for SRDI enterprises, which focuses on enhancing total factor productivity through coordinated evolution of technological and organizational architectures, thereby digitally strengthening specialized, refined, distinctive, and innovative capabilities. The study identifies three key characteristics: strategic orientation with high-quality constraints, cross-level coupling of driving factors, and highly dynamic transformation processes. These features reveal triple advantages in operational efficiency, innovation capacity, and management decision-making. The research further analyzes four critical challenges faced by enterprises—cognitive ambiguity, fragmented applications, security vulnerabilities, and resource shortages—along with their practical manifestations of "reluctance to transform, inability to transform, fear of transformation, and inability to transform." Optimization pathways are proposed across four dimensions: top-level design, system integration, security governance, and resource support. The integrated analytical framework established in this paper provides theoretical references for digital practices in SRDI enterprises and empirical evidence for digital policy design in small and medium-sized enterprises.

Keywords

Specialized, refined, distinctive and innovative enterprises, digital transformation, high quality, connotative characteristics, dilemma path

1. Introduction

Specialized, refined, distinctive, and innovative (SRDI) enterprises are increasingly emerging as pivotal micro-level actors in the digital economy era, driving industrial structure upgrades, enhancing supply chain resilience, and revitalizing regional innovation vitality (Chen et al., 2024; Yang & Xu, 2024). Against the backdrop of deep digital technology integration, reshaped market competition dynamics, and escalating uncertainties, digital transformation has evolved beyond being merely an auxiliary tool for operational efficiency improvement. It has become a core strategic imperative for SRDI enterprises to break through growth bottlenecks, reconstruct competitive advantages, and achieve high-quality sustainable development (Warner & Wager, 2019; Hess et al., 2016). However, compared to large enterprises, SRDI firms generally face structural constraints such as limited resource endowments, pronounced path dependence, and strong organizational inertia. Their digital transformation journey reveals a more complex paradox: ambiguous transformation motivations, fragmented driving factors, proliferating system silos, weak data security, scarcity of interdisciplinary digital talent, and unclear transformation performance expectations. These challenges collectively trap enterprises in a "three-dilemma" scenario: unwillingness to transform, inability to transform, incapacity to transform, and fear of transformation (Ghosh et al., 2022; Gupta & Bose, 2022; Cao et al., 2023). While existing research has systematically examined the driving forces and economic impacts of enterprise digital transformation through single-dimensional lenses such as digital technology empowerment, organizational capability restructuring, and institutional environment optimization (Wu et al., 2021; Wu et al., 2022; Jing et al., 2023), most studies focus on macro-level perspectives or mature large enterprises, neglecting the unique complexities of specialized, refined, distinctive, and innovative (SRDI) enterprises. Particularly lacking are systematic definitions of their "high-quality" transformation boundaries, structural analyses of underlying causes, dynamic evaluations of driving mechanisms, and integrated theoretical frameworks (Guo & Zheng, 2025). Addressing this gap, this study focuses on SRDI enterprises 'digital transformation as a core issue. It systematically defines the connotation and core characteristics of high-quality digital transformation, analyzes practical challenges and root causes in the transformation process, and proposes systematic optimization pathways through four dimensions: top-level design, system integration, security safeguards, and talent support. The research aims to provide a comprehensive theoretical framework and practical reference for SRDI enterprises' high-quality digital transformation, while offering transferable empirical evidence and theoretical insights for digital policy design in emerging economies.

2. The Connotation and Characteristics of Digital Transformation in Specialized, Refined, Distinctive and Innovative Enterprises

2.1 The Connotation of Digital Transformation of Specialized, Refined, Distinctive and Innovative Enterprises

Specialized, refined, distinctive, and innovative (SRDI) enterprises are small and medium-sized

businesses characterized by specialization, precision, uniqueness, and innovation. Their core competitiveness stems from technological expertise, process mastery, and market insight accumulated through long-term focus on niche sectors (Chen et al., 2022; Kong, 2024). Unlike conventional SMEs, SRDI enterprises typically occupy critical positions in industrial chains, undertaking strategic roles such as import substitution, technological breakthroughs, and supply chain enhancement. Consequently, their digital transformation is expected to deliver value beyond mere efficiency improvements (Yang & Xu, 2024; Zhang, 2025).

Corporate digital transformation denotes a systemic restructuring of strategic orientation, organizational architecture, business processes, and value creation models, driven by the deep integration of digital technologies with all enterprise operations (Hess et al., 2016; Vial, 2019). Existing research defines this transformation as a technological leap from "informatization" to "digitization" and ultimately to "intelligentization." At its core, it represents an organizational adaptive evolution where data evolves from auxiliary recording tools to core production factors, thereby driving sustained improvements in total factor productivity (TFP) (Wu et al., 2021; Liu et al., 2023).

Building on this foundation, this paper proposes the core connotation of "high-quality digital transformation" for specialized, refined, distinctive, and innovative enterprises: With the fundamental orientation of enhancing total factor productivity, the technical thread of efficient allocation of data elements, and strategic fulcrums including digital sedimentation of specialized capabilities, intelligent upgrading of refined operations, expansion of distinctive value networks, and reconstruction of novel innovation paradigms. Through the synergistic evolution of technical architecture and organizational structure, it achieves a qualitative leap from partial efficiency improvements to systemic competitiveness reshaping. This connotation comprises three levels: First, the target level—transformation not only pursues output scale expansion but emphasizes comprehensive improvements in input-output efficiency, innovation output quality, and risk resilience; Second, the process level—transformation is not a simple accumulation of technical tools but adaptive restructuring of technical architecture, organizational conventions, and external ecosystems; Third, the outcome level—transformation effectiveness manifests as digital enhancement of core competencies rather than substitutive dissolution of existing advantages.

2.2 Key Features of Digital Transformation in Specialized, Refined, Distinctive, and Innovative Enterprises

Unlike large enterprises undergoing systemic digital transformation, specialized, refined, distinctive, and innovative (SFDI) enterprises face constraints such as limited resource endowment, smaller organizational scale, and weaker management foundations, resulting in a distinct pattern of digital transformation.

First, strategic-driven high-quality constraints. The digital transformation of specialized, refined, distinctive, and innovative (SRDI) enterprises is not a generic technology adoption process, but rather deeply embedded in their strategic positioning of specialization, refinement, uniqueness, and

innovation (Li & Pan, 2025). Unlike the survival-oriented passive digitalization of general small and medium-sized enterprises, SRDI enterprises exhibit pronounced "quality-sensitive" characteristics: they demand higher standards for technological maturity, predictable ROI, and controllable core data. Their transformation decisions follow a cautious evaluation, incremental trial-and-error, and iterative advancement pattern. This feature serves both as an adaptive mechanism to mitigate transformation risks and as an inherent structural barrier that makes them "reluctant to transform" and "unable to transform."

Second, cross-level coupling of driving factors. The digital transformation of specialized, refined, distinctive, and innovative (SRDI) enterprises cannot be explained by a single technological factor, but rather results from the cross-level coupling of multiple elements including technological empowerment, organizational adaptation, and environmental regulation (Warner & Wager, 2019; Ghosh et al., 2022). Technologically, modular deployment of general technologies such as intelligent manufacturing systems, industrial internet platforms, and digital twins lowers adoption barriers. Organizationally, entrepreneurial digital leadership, the availability of interdisciplinary digital talent, and willingness to embrace digital transformation serve as endogenous drivers. Environmentally, digital spillovers from industry chain leaders, targeted policy support from local governments, and industry standardization collectively create external triggers. The differentiated configuration of these factors determines the diversity and context-dependent nature of SRDI enterprises' digital transformation pathways.

Third, the highly dynamic nature of transformation. The digital transformation of specialized, refined, distinctive, and innovative (SRDI) enterprises is not a linear technological upgrade, but rather a nonlinear dynamic process involving strategic review, resource integration, capability restructuring, and iterative path optimization (Xu & Zhang, 2025). In the initial phase, enterprises face strategic ambiguity about "where to transform"; during the implementation phase, they encounter resource constraints and capability bottlenecks regarding "how to sustain transformation"; and in the deepening phase, they confront organizational inertia and innovation lock-in risks concerning "how to maintain transformation post-transition". This dynamic process demands that SRDI enterprises possess high strategic flexibility and organizational learning capabilities, enabling adaptive adjustments to transformation paths based on evolving internal and external contexts.

Fourth, the digital enhancement of core competencies. The fundamental value of digital transformation for specialized, refined, distinctive, and innovative enterprises (SRDI enterprises) lies not in replacing existing business models, but in digitally strengthening their specialized technical expertise, refined operational capabilities, unique market positioning, and innovative advantages. Specifically, digitalization of manufacturing processes enables the codification and intelligent utilization of tacit process knowledge, enhancing production flexibility and consistency. Digital business models facilitate precise customer insight and personalized responses, expanding the boundaries of value capture. Digital organizational management achieves real-time integration and dynamic feedback of decision-making information, reducing managerial redundancy and decision-making delays. These

digital enhancement effects collectively reinforce, rather than weaken, the core competitive barriers of SRDI enterprises.

Fifth, the dual-dimensional structure of transformation performance. The performance indicators of digital transformation in specialized, refined, distinctive, and innovative (SRDI) enterprises exhibit a distinct two-dimensional framework. The first dimension focuses on manufacturing process digitization, primarily reflected in operational improvements such as enhanced production automation efficiency, strengthened internal process value-added capabilities, and improved product quality consistency. The second dimension centers on business model digitization, manifested through external market dimensions including elevated customer value creation capacity, enhanced value chain positioning, and amplified ecosystem synergy effects. These two dimensions are interdependent yet potentially contradictory: excessive emphasis on internal efficiency optimization may lead to delayed market responsiveness, while overreliance on business model innovation could erode existing technological advantages. Achieving balanced optimization across both dimensions constitutes the core management challenge for SRDI enterprises in realizing high-quality digital transformation.

3. Advantage Effects of Digital Transformation in Specialized, Refined, Distinctive and Innovative Enterprises

3.1 Enhancing Operational Efficiency and Resource Integration Capabilities

Specialized and innovative enterprises have accumulated substantial specialized assets in technological processes, customer relationships, and supply chain positioning. However, constrained by organizational scale and management foundations, the cross-departmental allocation and cross-scenario migration of these assets have long faced high friction costs. Digital transformation effectively resolves this constraint by leveraging the low marginal cost flow characteristics of data elements.

On one hand, digital platforms have enabled cross-departmental and cross-regional business collaboration and data integration. The integrated deployment of core systems such as Manufacturing Execution Systems (MES), Enterprise Resource Planning (ERP), and Product Lifecycle Management (PLM) has broken down information silos across R&D, procurement, production, sales, and service processes. This has led to systematic improvements in key operational metrics including order response cycles, inventory turnover rates, and equipment utilization efficiency. Real-time data collection and feedback control at production sites significantly reduce process deviation rates, while the integration of R&D and production data substantially shortens the trial-and-error cycle required to scale up laboratory achievements.

On the other hand, the cross-scenario reuse of data elements has significantly enhanced resource integration capabilities. The technical expertise and market insights of specialized, refined, distinctive, and innovative enterprises are deeply embedded in their core processes and customer service practices. Digital technologies can encode and preserve such tacit knowledge, transforming it into digital assets that can be leveraged across projects and iterated through cycles. As the stock of digital assets

continues to accumulate, companies can respond to differentiated demands and expand diversified operations at lower marginal costs. This evolution enables them to transition from single-product suppliers to modular solution providers, thereby achieving sustained growth in their value chain positioning.

3.2 Enhancing Innovation Capabilities and Market Competitive Advantages

The core competitiveness of specialized, refined, distinctive, and innovative enterprises stems from sustained technological innovation and differentiated market positioning. The empowering effect of digital transformation on innovation activities is realized through three mechanisms: restructuring innovation processes, optimizing innovation element allocation, and connecting innovation ecosystems.

In the innovation process, technologies like digital twins, simulation validation, and rapid prototyping have dramatically shortened the time window from concept to product. The traditional linear iteration model of "design—trial production—testing—modification" has transitioned to an agile R&D approach featuring parallel "simulation—validation—optimization," significantly reducing new product launch cycles. This enables companies to respond more swiftly to downstream demand changes and technological iterations.

In the realm of innovation factor allocation, the integration of data elements is fundamentally reshaping the composition of innovation activities. Digital transformation has significantly expanded the boundaries of corporate innovation entities, enabling more efficient incorporation of externally dispersed customer knowledge, supplier expertise, and research institution outcomes into internal innovation processes. Digital customer relationship management systems can precisely identify unmet needs of high-value customers and translate them into technical parameters for product development. Meanwhile, digital supply chain collaboration platforms allow core suppliers to participate in early-stage product design, leveraging their material expertise and process experience to enhance product manufacturability.

In the realm of innovation ecosystem connectivity, digital transformation is driving specialized, refined, distinctive, and innovative enterprises to evolve from passive industry chain adapters into pivotal nodes within the innovation ecosystem. By leveraging industrial internet platforms and industry-specific data spaces, companies can connect with diverse innovation stakeholders at lower costs, engage in cross-enterprise collaborative R&D and co-creation of technical standards, thereby transforming micro-level technological innovation advantages into meso-level market competitive barriers.

3.3 Optimization of Management Decision-making and Risk Control

Specialized, refined, distinctive, and innovative (SRDI) enterprises are predominantly led by technology-savvy entrepreneurs, whose management decisions exhibit pronounced technical rationality and empirical reliance. As these companies mature, the decision-making model that relies solely on founders' individual experience and post-event financial accounting increasingly reveals limitations such as information lag, cognitive biases, and coordination failures. Digital transformation addresses this structural contradiction through data-driven, visualized, and intelligent upgrades in management

decision-making.

First, the deployment of data middle platforms and business intelligence systems has achieved a leap from fragmented to integrated decision-making information. Digital management systems compress the frequency of operational data collection and processing to daily, hourly, or even real-time levels, enabling management to perceive dynamic changes in key metrics such as order fluctuations, capacity utilization, and capital turnover with finer temporal granularity. This advancement shifts the risk identification window forward and shortens the decision response arc.

Secondly, algorithm-assisted decision-making is expanding from consumer internet to industrial sectors. Machine learning-based demand forecasting models significantly enhance the scientific basis for safety stock management. Multi-source data fusion-driven customer risk profiling optimizes credit sales policies and bad debt provisions. Algorithmic pricing models, leveraging dynamic cost accounting and market competition simulations, help enterprises break free from the constraints of cost-plus pricing and continuously strengthen their value capture capabilities.

Thirdly, digital transformation has significantly strengthened the risk defense mechanisms of corporate internal controls. Digital management systems embed control rules such as segregation of incompatible duties, rigid budgetary constraints, and abnormal transaction alerts into business process information systems, transforming soft constraints based on human judgment into hard boundaries enforced by systems. For specialized, refined, unique, and innovative enterprises in the pre-IPO counseling or application phases, enhancing the digitalization of internal controls not only helps reduce financial misstatements and compliance risks but also serves as critical infrastructure for a smooth transition to public corporate governance standards.

4. Key Challenges in Digital Transformation for Specialized, Refined, Distinctive, and Innovative Enterprises

4.1 Insufficient Management Awareness and Ambiguous Strategic Positioning

Specialized, refined, distinctive, and innovative (SRDI) enterprises are predominantly led by technology-savvy founders who often view digital transformation as merely tool-level implementations—reducing it to software procurement, equipment upgrades, or system launches—while lacking deeper strategic understanding. Management's failure to elevate digital transformation to an enterprise-wide strategic priority results in ambiguous goals, fragmented resource allocation, and weak cross-departmental collaboration (Wu et al., 2022). Some companies only attempt partial digitalization in peripheral areas like finance and office operations, failing to address core business functions such as R&D, production, and supply chains, resulting in superficial and fragmented digital transformation. A deeper issue lies in the widespread absence of top-level governance mechanisms like Chief Digital Officers or Digital Strategy Committees in SRDI enterprises. This lack of clear decision-making bodies and organizational support for continuous digital transformation often leads to interruptions or delays due to founders' shifting focus or short-term operational pressures. This

cognitive bias constitutes the root cause of enterprises' reluctance to embrace digital transformation.

4.2 Insufficient Digitalization Adoption and Severe System Silos

Most specialized and innovative enterprises adopt a "point-to-surface, gradual advancement" approach in digital transformation. Constrained by initial budgetary limitations, companies tend to independently procure software systems by department or functional module. This results in inconsistent data standards and incompatible interfaces between core systems like ERP, MES, PLM, and CRM, creating de facto "data silos" (Xu & Zhang, 2025). Real-time operational data from production processes cannot be accessed by management departments, customer demand information struggles to reach R&D design stages promptly, and supply chain inventory fluctuations fail to dynamically align with production scheduling plans. This fragmented system not only diminishes the marginal returns of digital investments but also traps enterprises in a vicious cycle of "the more they build, the more chaotic it gets; the more they connect, the more difficult it becomes." While some companies have accumulated massive operational data, the lack of effective data governance frameworks and analytical capabilities prevents data assets from being transformed into actionable insights. Their digital transformation remains at a superficial stage of "having data but no utility." This application-level superficiality directly manifests as enterprises' inability to achieve meaningful transformation.

4.3 Weak Data Security and Privacy Protection Capabilities

Specialized, refined, distinctive, and innovative (SRDI) enterprises, which typically occupy critical positions in industrial chains, possess highly commercially sensitive information including process formulas, customer lists, and supply chain layouts. However, compared to large corporations, SRDI enterprises generally lag behind in organizational structures, regulatory frameworks, and technical protection capabilities within information security. On one hand, these companies lack systematic data classification and grading management systems, with core R&D data and routine operational data stored together. Coarse access permission settings and ineffective monitoring mechanisms for unauthorized employee data access or improper external transfers exacerbate this issue. On the other hand, after adopting cloud platforms, SRDI enterprises often lack robust data control over third-party service providers, resulting in ambiguous data sovereignty boundaries in cloud environments. This creates potential risks of data reuse or leakage (Cao et al., 2023). More critically, SRDI enterprises generally lack emergency response plans for data security incidents. In the event of ransomware attacks, system vulnerability exploitation, or internal leaks, they may face irreversible consequences such as loss of core technologies, damage to business reputation, or even operational disruptions. This security vulnerability serves as a major deterrent to enterprises' willingness to transition to cloud-based operations.

4.4 Dual Constraints of Funding and Talent

Compared to large enterprises, specialized, refined, distinctive, and innovative (SRDI) companies face more severe structural constraints in allocating capital and talent for digital transformation. Financially, digital transformation exhibits significant sunk cost characteristics and uncertain return cycles,

requiring continuous capital injections for hardware procurement, system licensing, secondary development, and operational upgrades. SRDI companies generally have limited scale and insufficient profit accumulation, with external financing primarily relying on bank loans, making it difficult to meet the long-term risk capital demands of digital transformation. When operational pressures emerge, digital transformation investments often become the first targets for compression and reduction. In terms of talent, digital transformation requires interdisciplinary professionals who understand both business and technology, possess industry expertise, and demonstrate data-driven thinking—capabilities highly concentrated in large platform enterprises and leading tech companies. Constrained by geographical location, salary levels, and career advancement channels, SRDI companies exhibit significant shortcomings in attracting and retaining high-end digital talent (Li & Pan, 2025). The low digital literacy of existing employees and the inability to attract or retain external top talent have led to the persistent dilemma of "built but unused, launched but unmaintained" digital systems. This fundamental talent shortage constitutes the core bottleneck preventing enterprises from achieving digital transformation.

5. Optimization Path of Digital Transformation for Specialized, Refined, Distinctive and Innovative Enterprises

5.1 Strengthening Top-Level Design to Enhance Management's Digital Leadership

The key to overcoming the "reluctance to transform" lies in elevating digital transformation from a technical tool to a corporate strategy. Specialized, refined, distinctive, and innovative (SRDI) enterprises should establish a digital strategy committee led by the founder or general manager to coordinate the development of digital transformation visions, phased objectives, and resource allocation plans, thereby preventing disruptions caused by departmental interests or short-term operational pressures. Management must systematically address gaps in digital literacy through benchmarking visits, digital transformation diagnostics, and specialized training, ensuring a deep understanding that digitalization enhances rather than replaces core competencies. For enterprises hiring professional managers, the effectiveness of digital transformation should be incorporated into management performance evaluations to establish a closed-loop mechanism for strategic transmission and accountability.

5.2 Drive System Integration to Build an Enterprise-level Data Platform

The key to overcoming the "data intransit" challenge lies in dismantling data silos and achieving cross-system interoperability. Specialized, refined, distinctive, and innovative enterprises should abandon fragmented, siloed procurement models. By establishing a data middle platform, they can unify data standards, interface specifications, and master data management systems, transforming scattered business data from heterogeneous systems like ERP, MES, PLM, and CRM into shareable, reusable, and analyzable enterprise-level data assets. For technical implementation, modular, configurable, and low-code industrial internet platform solutions should be prioritized to reduce system

integration barriers and secondary development costs. Building on this foundation, enterprises should progressively integrate business processes with data flows, evolving from "system interconnection" to "business collaboration" and ultimately achieving "intelligent decision-making," thereby embedding data elements into the core production function of enterprises.

5.3 Establishing a Digital Security Governance System

The prerequisite for addressing the "dare not transfer" dilemma lies in establishing risk mitigation capabilities aligned with digitalization. Specialized, refined, distinctive, and innovative enterprises should implement a tiered management system covering the entire lifecycle of data—from collection and transmission to storage, usage, and destruction. Differentiated data access permissions should be defined based on job responsibilities, with enhanced access controls and operational audits for sensitive information such as core process parameters, customer directories, and supply chain layouts. For enterprises adopting cloud platforms, service agreements must clearly define data sovereignty boundaries and third-party liabilities, while conducting regular penetration testing and emergency drills. Small and medium-sized enterprises can leverage regional or industry-specific industrial internet security public service platforms to access professional security monitoring, threat alerts, and incident response capabilities at lower costs, achieving synchronized progress in both cloud adoption and cloud protection.

5.4 Innovative Financing Mechanism and Talent Training Model

The fundamental solution to the "non-transfer" challenge lies in overcoming dual bottlenecks in funding and talent. On the funding front, specialized and innovative enterprises should proactively leverage policy-based financial instruments such as "digital transformation special loans," "digital equipment leasing," and "technical upgrade subsidies" to alleviate initial cash flow pressures during transition. Qualified companies may adopt phased, subscription-based digital service procurement models to convert fixed capital investments into operational expenses. Regarding talent development, enterprises should embrace a flexible recruitment philosophy of "not seeking ownership but utilization," acquiring critical digital expertise through project collaborations, advisory guidance, and cloud-based crowdsourcing. Concurrently, increased investment in internal digital skills training is essential. By partnering with digital service providers to jointly cultivate hybrid talents proficient in both processes and data, companies can establish an endogenous foundation for digital transformation capabilities.

6. Conclusion

This study systematically defines the core connotations and typical characteristics of high-quality digital transformation in specialized, refined, distinctive, and innovative (SRDI) enterprises, revealing their triple advantages in operational efficiency, innovation capability, and management decision-making. It further analyzes four structural challenges currently faced by enterprises: cognitive ambiguity, fragmented applications, security vulnerabilities, and resource shortages. Based on this, the paper proposes a systematic optimization path for digital transformation from four dimensions:

top-level design, system integration, security governance, and resource support. The research concludes that the essence of high-quality digital transformation in SRDI enterprises lies in strategic capability restructuring oriented toward total factor productivity improvement, which relies on the coordinated evolution of strategic cognition, technological architecture, risk prevention, and resource assurance. The integrated analytical framework established in this paper— "connotation definition—characteristic extraction—effect analysis—challenges diagnosis—path optimization" —provides theoretical references and decision-making tools for digital practices in SRDI enterprises, while also contributing empirical evidence for digital policy design in emerging economies. Future research could focus on frontier topics such as coordinated digitalization and green transformation, platform ecosystem integration, and the application of generative AI in SME scenarios.

References

Cao, Y. H., Zhang, Y. L., Shi, R. R., Yin, Q. Y., & Song, D. (2023). A Study on the Antecedent Configurations of Organizational Resilience in Specialized, Refined, Distinctive, and Innovative "Little Giants" Driven by Digital Transformation: An fsQCA Analysis Based on Annual Report Text Mining of Listed Companies. *Foreign Economics and Management*, *45*(10), 68-83. (in chinese)

Chen, J. Y., Wang, X. C., Chang, H. D., & Tian, J. (2024). "Specialized, Refined, Unique, and Innovative" Certification Policy and Technological Innovation in Small and Medium-sized Enterprises. *Scientific Research Management*, *45*(3), 20-30. (in chinese)

Ghosh, S., Hughes, M., Hodgkinson, I., Hughes, P., Ghosh, S., Hughes, M., Hodgkinson, I., & Hughes, P. (2022). Digital transformation of industrial businesses: A dynamic capability approach. *Technovation*, *113*, 102414.

Guo, J. H., & Zheng, Q. (2025). Exploring the Multiple Driving Paths of Digital Transformation in Specialized, Refined, Distinctive, and Innovative "Little Giant" Enterprises-A fsQCA Analysis Based on the Technology-Organization-Environment Framework. *China Science and Technology Forum*, (6), 89-100. (in chinese)

Gupta, G., Bose, I., Gupta, G., & Bose, I. (2022). Digital transformation in entrepreneurial firms through information exchange with operating environment. *Information & Management*, *59*(3), 103243.

Hess, T., Matt, C., Benlian, A., & Wiesböck, F. (2020). Options for formulating a digital transformation strategy. In *Strategic information management* (pp. 151-173). Routledge.

Jing, H., Zhang, Y. Y., Ma, J., & Zhu, J. (2023). Research on the Configuration Path of Dual Competency Enhancement for "Specialized, Refined, Unique, and Innovative" Enterprises under the Background of Digital Transformation. *Science and Technology Management Research*, *43*(22), 164-174. (in chinese)

Kong, W. (2024). Analysis of Factors Influencing Digital Transformation in Specialized, Refined,

Distinctive, and Innovative Enterprises. *Enterprise Economics*, *43*(3), 90-102. (in chinese)

Li, P., & Pan, X. F. (2025). The impact of digital transformation on innovation performance of specialized, refined, distinctive, and innovative small and medium-sized enterprises. *Economic and Management Review*, *41*(1), 109-120. (in chinese)

Warner, K. S., & Wäger, M. (2019). Building dynamic capabilities for digital transformation: An ongoing process of strategic renewal. *Long range planning*, *52*(3), 326-349.

Wu, C. Q., Zhang, K. X., Zhou, X. Y., & Zhou, Z. X. (2022). Digital Transformation, Competitive Strategy Choice, and High-Quality Development of Enterprises: Evidence Based on Machine Learning and Text Analysis. *Economic Management*, *44*(4), 5-22. (in chinese)

Wu, F., Hu, H. Z., Lin, H. Y., & Ren, X. Y. (2021). Digital Transformation and Capital Market Performance: An Empirical Study Based on Stock Liquidity. *Management World*, *37*(7), 130-144,10. (in chinese)

Xu, Y. Y., & Zhang, X. (2025). The Empowerment Mechanism of Digital Platforms for Manufacturing Enterprises' Digital Transformation: An Exploratory Study Based on Multiple Cases. *Contemporary Economic Management*, *47*(8), 19-29. (in chinese)

Yang, L., & Xu, P. D. (2024). The interdependence of existence and non-existence: A study on the antecedent configuration and effects of dual innovation in "specialized, refined, distinctive, and innovative" single-champion enterprises under the digitalization background. *Nankai Management Review*, (2), 137-149. (in chinese)

Zhang, X. (2025). Technology Embedding and Industrial Chain Synergy in the Digital Transformation of Specialized, Refined, Distinctive, and Innovative Enterprises. *Journal of Fujian Normal University (Philosophy and Social Sciences Edition)*, (3), 51-59,169. (in chinese)