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Digital Transformation Capability, Organizational Strategic Intuition, and Digital Leadership: Empirical Evidence from High-Tech Firms' Performance in the Yangtze River Delta

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Abstract

Despite growing scholarly interest in digital transformation, few studies have systematically explored the mechanisms linking digital transformation capability to firm performance. This study examines both the direct and indirect effects of digital transformation capability on firm performance, offering novel insights by incorporating organizational strategic intuition and digital leadership as mediating variables. These mediators align with the emerging emphasis on strategic risk management in the literature. A survey was conducted among 620 high-tech enterprises in the Yangtze River Delta using a structured questionnaire. The data were analyzed using SPSS 23.0 for descriptive and correlational statistics, SmartPLS 4.0 for structural equation modeling (SEM), and PROCESS 4.2 for mediation analysis. The results reveal a significant direct effect of digital transformation capability on firm performance. Mediation analysis further shows that organizational strategic intuition and digital leadership each significantly mediate this relationship, and a chain mediation pathway involving both variables is also confirmed. These findings deepen our understanding of how digital transformation capability drives performance outcomes and offer practical guidance for high-tech firms seeking sustainable competitive advantages in dynamic digital environments. This study advances the theoretical discourse by clarifying the pathways through which digital transformation capability affects firm performance and provides empirical evidence to inform strategic decision-making in high-tech management.

Keywords: digital transformation capability; firm performance; organizational strategic intuition; digital leadership; resource-based view

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1. Introduction

Along with the fast growth of digital technology, the application becomes increasingly deeper and broader, and more and more companies are paying attention to building their digital transformation capability (Chen, 2023). This trend is especially applicable in the area of sustainability because digital transformation is not only a means of operational excellence but also a strategic engine for long-term sustainable development. Incumbent industries have been influenced by their models of value creation as a result of the rampant use of digital technology in the real economy, which has made business operations more efficient,

responsive, and environmentally friendly. Digital transformation capability improves efficiency and quality and, hence, firm performance (Annarelli et al., 2021; Han et al., 2022), and it also facilitates sustainable utilization of resources and innovation-based growth. It enhances effective utilization of resources, enhances market responsiveness, and is strategically agile, all of which are important in realizing sustainable and resilient business performance (Chi et al., 2023). Previous research studies have examined the effect of digital transformation capability on company performance, but few have explored the indirect channels—specifically, strategic organizational intuition and digital leadership—through which digital transformation enhances sustainable performance.

In this regard, the present study aims to answer some less-explored questions in the recent literature. First, it clarifies how digital transformation capability aids sustainable, long-term organizational growth compared to purely concentrating on short-term profitability. Second, it proposes organizational strategic intuition as a new cognitive mechanism facilitating forward-looking and nimble decision-making and enhancing sustainability-driven digital transformation. Third, it speculates electronic leadership as a pattern of leadership suited to the era of electronics, which integrates sustainability values into electronic initiatives and strategies. Fourth, by capitalizing on empirical insights developed out of China's Yangtze River Delta high-tech companies, this research responds to increasing demands for sustainability-themed accounts of the new digital economies. This study fills this gap by investigating how these drivers function as chain mediators to transmit digital transformation capabilities toward sustainable firm performance outcomes, thereby expanding our insight into the mechanisms on which digital sustainability relies.

All over the world, high-tech industries' development is still given top priority because they are associated with the world market and play a key role in ensuring sustainable industrial development. High-tech and new technologies enhance the power and security of national economic strength and enable sustainable industrial changes by changing conventional production modes and green innovation. These technological advancements propel overall progress in social production and daily life, providing a foundation for human-centered and sustainable development. In this context, all countries place high-tech and new technology industries atop the agenda as a top priority in international competition. High-tech companies—innovation's most powerful drivers—are at the forefront of translating technological victories into real, sustainable uses (Lin, 2023). As the representative institutions of innovation (H. L. Wang, 2023), these companies are at the forefront of China's implementation of the strategy of innovation-driven development and are strong drivers of sustainable economic development (Y. L. Li, 2024). The Yangtze River Delta region is not left behind, supporting China's most economically dynamic area through continuous investment in high-tech sectors. This regional model shows how digital innovation and high-tech development can contribute to supporting high-quality, sustainable development (Y. F. Zhang & Lu, 2024).

Being one of the most dynamic, open, innovative, and comprehensive industrial systems of China, the Yangtze River Delta region has a grand mission to drive forward the new industrial revolution and create a world-class innovation city cluster. It is aiming to construct the world's most dynamic scientific and technological innovation and high-tech industry core area. Compared to other places, the Yangtze River Delta, being one of the most economically developed areas of the country, has the critical mission of spearheading China's high-quality economic growth and industrial and technological innovation. At the same time, the Chinese Ministry of Science and Technology issued the "Development Plan for the Construction of the Yangtze River Delta Science and Technology Innovation Community" in December 2020, stating that with the new development paradigm of the new era, integral development of the Yangtze River Delta's science and technology

innovation is an unavoidable trend, forming a special environment for the promotion of digital transformation capability (Guo et al., 2023).

In this context, the current study seeks to offer theoretical insights as well as practical recommendations for encouraging high-tech company stakeholders to embrace sustainable practices via digital transformation. Particularly, it aims to (1) investigate the contribution made by digital transformation capability to sustainable firm performance; (2) conceptualize and study organizational strategic intuition as a cognitive precursor of sustainability-oriented digital transformation; (3) study the role played by digital leadership in instilling sustainability values in digital transformation efforts; and (4) propose and empirically test an integrated framework connecting digital transformation capability, organizational strategic intuition, digital leadership, and sustainable firm performance. By determining the indirect routes through which digital skills shape sustainability, this research advances academic understanding and offers pragmatic pathways for aligning high-tech business practice and the United Nations' Sustainable Development Goals (SDGs).

The remainder of this article is organized as follows. Section 2 presents an overview of the theoretical foundations and hypothesis development. Section 3 outlines the research methodology, including the population and sample, data collection procedures, variable measurement, and data analysis techniques. Sections 4–6 report the empirical findings, discuss the results, and conclude this study.

2. Theory and Hypothesis

To address the growing significance of digital transformation in today's volatile, uncertain, complex, and ambiguous (VUCA) business environment, this study draws upon three theoretical perspectives—resource-based view (RBV), dynamic capability theory, and upper echelons theory. This study aims to explore the following research questions: How does digital transformation capability influence firm performance? What roles do organizational strategic intuition and digital leadership play in this relationship? Do these two constructs jointly function as a chain mediator between digital transformation capability and firm performance? These theoretical perspectives help explain how internal resources and managerial cognition interact to influence performance outcomes in a digital context.

The resource-based view (RBV) identifies the scarcity and unique nature of internal resources and capabilities as essential elements for establishing a lasting competitive advantage (Barney, 1991). Digital transformation capability stands out as an essential resource because it helps enterprises improve resource distribution and operational efficiency while promoting innovation that leads to enhanced firm performance (Jiang et al., 2023). The resource-based view also focuses on how digital leadership functions as a key element in merging digital resources with strategy execution. Digital leaders who coordinate and integrate resources have a substantial impact on firm performance (Q. Li et al., 2022).

Dynamic capability theory expands upon the Resource-Based View (RBV) by focusing on how enterprises reconfigure resources to maintain competitive advantage in fast-evolving environments (Teece et al., 1997). Through its function as a dynamic capability, digital transformation capability allows companies to respond to market changes by maintaining ongoing innovation and flexibility while improving strategic decision-making abilities within organizations (Songkajorn et al., 2022). The research suggests that strategic intuition enables companies to rapidly find market possibilities while enhancing their strategic choices and digital leadership capabilities to boost overall corporate performance. Digital leadership serves as a dynamic capability that helps enterprises adjust to environmental changes while enhancing firm performance. The upper echelons theory demonstrates how senior managers' unique traits, along with their past experiences and mental models, profoundly influence strategic choices (Hambrick & Mason, 1984). It further

stresses that senior executive digital leadership enables firms to convert digital capabilities into strategic benefits that boost their total performance.

In summary, this research systematically explains the complex interaction between digital transformation capability, organizational strategic intuition, digital leadership, and firm performance, providing a theoretical basis for sustainable firm performance in the digital era.

2.1. Digital Transformation Capability and Firm Performance

Digital transformation capability refers to an enterprise's comprehensive ability to adapt to the digital environment by integrating internal and external resources, utilizing data-driven decision-making, building a flexible and agile organizational structure, and effectively engaging stakeholders to achieve continuous innovation and optimize business processes (M. Wang et al., 2022). According to Pan et al. (2021), digital transformation capability is a core competency for enterprises operating in technology-intensive environments, enabling them to address rapidly evolving technical challenges and uncertainties. For instance, the use of industrial robots in manufacturing has demonstrated that automated production lines not only enhance operational accuracy but also increase efficiency and reduce costs (Ma et al., 2023). Drawing on the resource-based view and dynamic capability theory, Wei and Zong (2021) examined the relationship between big data capability and firm performance, finding a significant positive correlation. Furthermore, Sousa-Zomer et al. (2020) argue that digital technologies enhance a firm's ability to perceive and manage environmental complexity, allowing them to adapt or redefine core activities to improve survival and competitiveness. Amornkitvikai et al. (2022) emphasized the significance of digital transformation capability in establishing competitive and sustainable e-commerce strategies. Drawing on the literature related to dynamic capability and digital transformation, the current research conceptualizes and explores the antecedents of digital transformation capability and its influence on competitive advantage.

Dynamic Capabilities Theory indicates that digital transformation capability allows enterprises to adjust to quick market changes while improving their performance levels (Teece, 2007). Digital transformation capability boosts firm performance through improved operational efficiency while also promoting innovation and strengthening competitive positioning. The performance of companies will likely improve as they advance their digitalization and develop stronger transformation capabilities. Therefore, hypothesis H1 is proposed in this research:

H1. *Digital transformation capability positively affects firm performance.*

2.2. The Mediating Role of Organizational Strategic Intuition

Strategic intuition is a cognitive process that forms strategic thinking by connecting various elements in memory (Duggan, 2013). Organizational strategic intuition is divided into three key dimensions: Learning from History, Business Strategy Creation, and Resolution (Songkajorn et al., 2022). Every enterprise must prioritize the pursuit of sustainability to ensure long-term success, even in the face of complex challenges (Pathak et al., 2023). Organizational strategic intuition functions as a critical process that allows enterprises to make quick decisions amid complex and fast-changing environments using intuitive cognition (Songkajorn et al., 2022). Research demonstrates that traditional rational analysis falls short in responding to external changes within markets that face constant uncertainty and challenges (Liang & Cao, 2021). In these types of situations, intuitive decision-making serves as an essential instrument for preserving competitive standing while capitalizing on market opportunities (Canco et al., 2021). According to Hallo and Nguyen (2021), enterprise leaders use intuitive decision-making to make fast decisions by drawing upon their

experience combined with environmental conditions and specific situational attributes. Such an approach improves organizational results through the successful combination of internal capabilities and external assets.

Strategy requires the design of dynamic capabilities that enable organizations to respond effectively to emerging challenges through their business models (Warner & Wäger, 2019). At the same time, digital transformation facilitates the conversion of tacit knowledge into explicit knowledge—and vice versa—embedding this knowledge within the organizational memory of its members (Fernandes, 2018). This process aligns with the initial phase of strategic intuition development. In the final phase, known as the resolution stage—where the determination to act is formed—digital transformation plays a supportive role by enabling the execution of strategy through digital technologies, such as digital artifacts, platforms, and infrastructure (Nambisan, 2017; Rapoport & von Clausewitz, 1968). Since digital transformation is closely tied to changes in an organization's business model, it influences shifts in products, organizational structures, and internal processes (Hess et al., 2016). According to dynamic capabilities theory, enterprises respond to external environmental changes by continuously reconfiguring their resources and capabilities. In this context, digital transformation capability is a critical dynamic capability that supports key organizational abilities, including strategic intuition, to achieve and sustain competitive advantage (Barney, 1991).

To sum up, the digital transformation capability enhances the strategic intuition of managers by improving the digital technology level and information processing ability of enterprises. Organizational strategic intuition enables managers to better identify opportunities and threats in the market and make effective decisions. In turn, these efficient decisions directly promote the improvement in firm performance through resource optimization and strategy execution. To put it another way, the ability to transform digitally improves organizational strategic intuition, which, in turn, improves firm performance. Therefore, hypothesis H2 is proposed in this research:

H2. *Organizational strategic intuition plays a mediating role between digital transformation capability and firm performance.*

2.3. Mediating Role of Digital Leadership

Organizational digitalization has driven changes in leadership and management dynamics through the adoption and expansion of digital technologies (Huang, 2023). The rise of e-leadership stems from advancements in digital technology that operate in the VUCA environment characterized by volatility and ambiguity (Kraft, 2019). The concept of digital leadership was first proposed by the Avolio scholar. He believed that digital leadership is essentially an influence process mediated by information technology that promotes changes in emotions, behaviors, thoughts, etc., among individuals, teams, and organizations as a whole (Avolio et al., 2000). The environmental changes instigated by digital technology development inspire digital leadership emergence, according to Cortellazzo et al. (2019). Organizations now regard digital transformation capability as a foundational engine for propelling both their change initiatives and developmental progress (Su et al., 2022). Studies demonstrate that executive-level digital leadership is essential for managing continuous technological changes (Borowska, 2019).

The upper echelons theory (Hambrick & Mason, 1984) indicates that the strategic decisions and outcomes of enterprises depend largely on top managers' backgrounds, experiences, cognitive processes, and value systems. Decision-makers' personality traits frequently determine the direction of corporate decisions, according to this theory. Organizations now require digital leadership, which combines digital thinking with traditional leadership skills to effectively tackle digital challenges in unpredictable contexts (Liu et al.,

2024). Managing digital change requires digital leadership, which strengthens organizational performance and encourages innovation and creativity (Dewi & Sjabadhyni, 2021). According to Basuki et al. (2015), who used dynamic capability theory and data from Indonesia's manufacturing industry as evidence, leadership style significantly impacts firm performance by developing and utilizing dynamic capabilities. Trakarnsirinont et al.'s (2023) research encourages relevant market participants to pay more attention to incorporating change management and risk management into their strategic planning to cope with the dynamic environment around the enterprise.

Digital transformation capability, therefore, prepares leaders to handle digital change more effectively through enhanced digital leadership. This development may lead to improved capabilities for making effective digital strategic decisions. Greater digital leadership capabilities may also result in improved business performance outcomes. Digital transformation capability has the potential to boost digital leadership capabilities, which then drives better firm performance outcomes. Hence, hypothesis H3 is proposed in this research:

H3. *Digital leadership plays a mediating role in the relationship between digital transformation capability and firm performance.*

2.4. The Role of Organizational Strategic Intuition and Digital Leadership in Chain Mediation

The prior discussion shows that digital transformation capability allows enterprises to manage complex environments and technology shifts effectively. Digital transformation capability develops strategic intuition among managers and throughout the entire organization. Organizational strategic intuition defines how managers utilize their expertise and knowledge to make informed decisions in uncertain situations. This capability allows managers to quickly recognize market opportunities and threats within a complex digital ecosystem while making agile decisions based on informed analysis (Songkajorn et al., 2022). Effective digital leadership not only shapes strategic vision but also has a significant interaction with firm performance (Al Farooque et al., 2019). Organizational strategic intuition serves as a vital asset in enabling leaders to make precise strategic choices within complex digital transformation environments, which ultimately strengthens digital leadership. Through the development and execution of successful digital strategies, organizations can anticipate and handle various digital transformation challenges while seizing emerging opportunities, which results in enhanced innovation and improved organizational performance (Mihardjo et al., 2019).

Based on the comprehensive discussion above, the following conclusion can be drawn: Digital transformation capability builds organizational strategic intuition, which reinforces digital leadership and results in better firm performance. Therefore, this research proposes the following hypothesis:

H4. *Organizational strategic intuition and digital leadership play a mediating role in the relationship between digital transformation capability and firm performance.*

This study integrates the resource-based view (RBV), dynamic capability theory, and upper echelons theory to explain how digital transformation capability influences firm performance. The RBV highlights the significance of internal resources as valuable, rare, and inimitable assets that form the basis of competitive advantage (Barney, 1991). Dynamic capability theory further elaborates on how firms develop, integrate, and reconfigure these resources to adapt and respond to rapidly changing environments (Teece et al., 1997). Upper echelons theory emphasizes the cognitive characteristics of top managers, suggesting that

managerial interpretation and strategic decision-making significantly affect firm outcomes (Hambrick & Mason, 1984).

As discussed previously, the ability of digital transformation enhances an enterprise's capacity to cope with complex environments and technological changes and can strengthen the strategic intuition of managers and the organization as a whole. Strategic intuition enables managers to better identify potential market opportunities and threats and make faster and more accurate decisions. The organizational strategic intuition of an organization further enhances digital leadership and improves firm performance by improving managers' understanding and judgment of complex environments. By identifying organizational strategic intuition and digital leadership as key mediating variables, whether independently or sequentially, this study addresses a gap in the existing literature regarding how digital transformation capability drives sustainable firm performance. It not only uncovers the underlying mechanisms of successful digital transformation but also offers a comprehensive perspective that combines resource-based, dynamic, and cognitive viewpoints.

3. Methodology

This research adopts a survey method using a questionnaire as a chosen method to obtain data for testing the proposed hypotheses. To reduce social expectation bias and common method bias, this study adopted anonymous filling methods, Harman single-factor tests, and other methods for control and testing. The results showed that there was no obvious common method bias. A total of 620 samples were drawn from a list made by the Ministry of Science and Technology of China. As of the end of August 2023, there were 392,206 high-tech firms in mainland China. Details are as follows:

3.1. Development of Questionnaire

The questionnaire was developed through a rigorous six-step process based on established methodological guidelines (Fowler, 1995). This process began with a comprehensive literature review to identify the core variables and corresponding measurement items, including digital transformation capability, organizational strategic intuition, digital leadership, and firm performance. The final questionnaire consisted of 88 items, organized into three main sections. Regarding the measurement scale for each variable, a 6-point Likert scale was chosen, as recommended in prior research (Bollen, 1989). Unlike the 5-point or 7-point systems that include midpoints, the 6-point system deliberately eliminates neutral options, encouraging respondents to take a stance rather than choosing middle or indecisive answers (Krosnick & Fabrigar, 1997). Leung's (2011) study compared the Likert scales at 4 points, 5 points, 6 points, and 11 points and found that the data on the 6-point and 11-point scales were closer to the normal distribution. This indicates that, compared with the five-point scale, the six-point scale may have an advantage in data distribution. Accordingly, this research adopted a 6-point Likert scale, ranging from 1 ("strongly disagree") to 6 ("strongly agree"); this scale has been shown to increase response variability and reduce central tendency bias in organizational research (Preston & Colman, 2000).

Each core variable in this study was measured using a well-developed multi-item scale adapted from the literature. Digital transformation capability refers to the digital transformation capability proposed by Yu et al. (2022), which is the capability corresponding to the digital environment of enterprises and is an essential capability for the survival of enterprises. This includes the ability of enterprises to utilize advanced platforms such as information, communication, and control to provide an integrated platform for digital production technologies, effectively and extensively connecting various stakeholders such as technology providers, manufacturing plants, supply chains, and service providers. They proposed that the core of digital transformation capability lies in three key dimensions:

perception, organization, and reorganization. There are 7 questions in each part, totaling 21 items. Organizational strategic intuition is a key resource for an organization to gain a competitive edge in a complex and ever-changing market environment, and it is divided into three dimensions: Learning from History, Business Strategy Creation, and Resolution (Songkajorn et al., 2022). In light of the context of China's high-tech enterprises, the sentences have been revised. There are 5 questions in each part, totaling 15 items. Digital leadership combined (Z. Zhang & Zheng, 2023) and (Braojos et al., 2024) proposed that digital leadership is a multi-dimensional construct, dividing digital leadership into the ability to transform digital thinking, the ability to build digital resources, the ability to empathize with digital ethics, and the ability to practice digital cognition. There are 5 questions in each part, totaling 20 items. Firm performance draws on the project evaluation mechanism of JICA and adopts the five elements advocated by the Organisation for Economic Cooperation and Development (OECD) in 1991 as the project evaluation criteria, namely, Relevance, Impact, and Effectiveness; Efficiency; and Sustainability (Lamhauge et al., 2013). Considering the context of China's high-tech enterprises, the sentences have been revised. There are 5 questions in each part, totaling 20 items.

3.2. Population and Sample

This research uses the Yamane formula (Yamane, 1973) to accurately calculate the sample size, making the research results more accurate and persuasive. The reason for selecting the Yamane formula is that it has shown good applicability in large-scale population studies, particularly in large-scale group research. Sample size is calculated as follows:

$$n = \frac{N}{1 + Ne^2}$$

where

n = sample size;
N = population size;
e = precision or desired margin of error (5%).

According to data from the official website of the Ministry of Science and Technology of China, as of the end of August 2023, there were 392,206 high-tech firms in mainland China (excluding Hong Kong, Macau, and Taiwan). Among them, more than 100,000 high-tech firms are located in the Yangtze River Delta region, accounting for more than 27% of the total number of high-tech firms in China, nearly one-third of the total. Therefore, the appropriate sample size for high-tech firms should be more than 300. According to the requirement of the structural equation model for sample size, the sample size should be at least 5 to 10 times that of the independent variable (M. Wu, 2010). According to this suggestion, there are 88 questions in this paper, and a sample size of 440–880 is required.

3.3. Data Collection

This research collected quantitative data through a questionnaire survey. The data collection process involved the following steps: First, an online questionnaire was created using the Questionnaire Star platform, a tool specialized in survey design and distribution. Data was then collected through three main channels: (1) Online distribution via WeChat, including sharing the questionnaire link through individual messages, group chats, and WeChat Moments; (2) The key informant method, in which questionnaires were disseminated through family members, colleagues, and friends, who were asked to forward the survey to potential respondents within their social networks; and (3) On-site visits, during which the researcher contacted relevant organizations in advance—such as the Federation of Industry and Commerce, industry associations, and MBA programs—to obtain permis-

sion for conducting face-to-face interviews and distributing paper questionnaires. Through these combined efforts, the research successfully collected 620 valid responses.

3.4. Data Analysis

This study used both descriptive and inferential statistical processes. Descriptive statistics and correlation analysis were first carried out using SPSS 23.0 to investigate sample characteristics and relationships among significant research variables. Normality testing was undertaken, and Pearson correlation analysis for the main variables was carried out. This study then utilized Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4.0. PLS-SEM was employed since it was appropriate for exploratory research, could address complex models, accommodate non-normal data distribution, and still perform well even with small-to-medium-sized samples (Hair et al., 2019).

This research adopted a reflective measurement model based on theoretical reasoning and the conceptual nature of the relationships between latent constructs and their indicators. In accordance with the guidelines outlined by Hanafiah (2020), the latent constructs are defined as underlying theoretical concepts that give rise to the observed indicators. Thus, the indicators are treated as manifestations of their respective latent variables, which aligns with the assumptions commonly associated with reflective measurement models (Coltman et al., 2008). The reliability, convergent validity, and discriminant validity of the measurement model were evaluated. Following the validation of the measurement model, collinearity diagnostics, R^2 values, F^2 effect sizes, and path coefficients were assessed to examine the structural model. Finally, the chain mediation effects among the research variables were examined using the PROCESS macro version 4.2. A bootstrapping procedure with 5000 resamples was applied to estimate the bias-corrected confidence intervals for the indirect effects.

4. Results

4.1. Descriptive Statistics

Descriptive statistical analysis was conducted based on the 620 valid questionnaires collected. This analysis included respondents' background information as well as details about the companies they work for. Variables examined included gender, age, education level, years of work experience, income, type of enterprise, nature of enterprise ownership, enterprise size, year of establishment, position, department, and company location.

In the sample, male participants account for 67.4%, while female participants comprise 32.6%. Regarding age distribution, the largest group falls within the 36–45 age range, representing 35.3%, followed by those aged 46–55, who account for 26.3%. Combined, these two groups constitute most of the sample. Participants aged 26–35 make up 24.7%, while those aged 18–26 and 56 or above represent smaller proportions, at 4.0% and 9.7%, respectively. In terms of educational background, 46.8% of participants hold an associate's or bachelor's degree, while 44.0% have a postgraduate degree or higher. This suggests that the sample is generally well-educated, with the majority holding at least a bachelor's degree. Only 9.2% of respondents have a high school education or lower. With respect to work experience, the most common range is 6–8 years, accounting for 28.4% of the sample, followed closely by 9–15 years at 27.4%. Participants with less than 1 year and 1–2 years of experience represent 3.4% and 8.9%, respectively. Regarding monthly income, the highest proportion of participants earn between CNY 5001 and CNY 7000, representing 38.4%, followed by those earning CNY 7001–CNY 10,000, at 26.0%. Participants earning more than CNY 10,000 account for 12.3%, while only 7.6% report earnings below CNY 3001. The distribution of company-related characteristics is presented in Table 1.

Table 1. Distribution of company characteristics.

Name	Options	Frequency	Percentage (%)
1. Industry	Agriculture	54	8.710
	Manufacturing	67	10.806
	Construction	111	17.903
	New energy	39	6.290
	Finance	41	6.613
	Software and information	76	12.258
	Wholesale and retail	18	2.903
	Education and culture	92	14.839
	Transportation, telecommunications, and tourism	84	13.548
	Energy: Electricity, heat, gas, and water	38	6.129
2. Ownership	State-owned enterprise	81	13.065
	Private enterprise	254	40.968
	Foreign-funded enterprise	159	25.645
	Joint venture	88	14.194
	Other	38	6.129
3. Size	Less than 100 people	45	7.258
	100–499 people	240	38.710
	500–999 people	226	36.452
	More than 1000 people	109	17.581
4. Established	Less than 5 years	54	8.710
	6 to 10 years	184	29.677
	11–20 years	274	44.194
	Over 21 years	108	17.419

n = 620, Source: authors.

Table 1 shows that most sampled firms are from the construction and education industries, accounting for 17.9% and 14.8%, respectively. The manufacturing and software/information sectors also represent significant portions of the sample, at 10.8% and 12.3%. In terms of company ownership, private enterprises constitute the largest group at 40.97%, followed by foreign-invested enterprises at 25.6%. State-owned enterprises account for 13.1%, while joint ventures and other types of enterprises represent 14.2% and 6.1%, respectively. Regarding company size, the largest proportion of respondents work in firms with 100–499 employees (38.7%), followed by those in firms with 500–999 employees (36.5%). Companies with fewer than 100 employees account for 7.3%, while those with more than 1000 employees represent 17.6%. As for the years of establishment, firms that have been in operation for 11–20 years make up the largest share at 44.2%. Companies established 6–10 years ago account for 29.7%; those with over 21 years of operation represent 17.4%, and firms established within the past 5 years make up 8.7%.

The mean values of all measurement items range from 3.5 to 4.1, while the standard deviations range from 1.032 to 1.345. The absolute values of skewness fell between 0.034 and 0.224, and the absolute values of kurtosis ranged from 1.035 to 1.333. These values are within the acceptable thresholds, with skewness less than 3 and kurtosis less than 8, as suggested by (Kline, 2016). These results indicate that the data distribution is normal, and the assumptions of normality are met for subsequent statistical analyses.

4.2. Common Method Deviation Test

Since all variables in this research were self-reported by participants, Harman's single-factor test was employed to assess the potential impact of common method bias (Zhou & Long, 2004). This statistical control method uses the percentage of variance explained by the first unrotated factor as the basis for judgment. The results indicate that the first

factor accounts for 38.032% of the total variance, which is below the commonly accepted threshold of 40%. This suggests that common method bias is not a significant concern in this research, and the data are suitable for further analysis.

4.3. Reliability and Validity

Garson (2016) proposed that a Cronbach's alpha value of 0.80 or higher indicates good reliability, while a value of 0.70 is considered acceptable, and a value of 0.60 may be sufficient for exploratory research purposes. In this research, Cronbach's alpha coefficients for digital transformation capability, organizational strategic intuition, digital leadership, and firm performance all exceed 0.80, indicating high internal consistency and strong reliability of the measurement scales.

To assess the validity of the measurement model, both convergent validity and discriminant validity tests were conducted. Convergent validity was evaluated using the Average Variance Extracted (AVE) and Composite Reliability (CR) values. According to Fornell and Larcker (1981), acceptable convergent validity must meet the following criteria: standardized factor loadings should be greater than 0.70; CR values should exceed 0.70, and AVE values should be greater than 0.50. The results show that all standardized factor loadings exceed 0.70, the AVE values are all above 0.50, and the CR values are all greater than 0.70. These results indicate that the measurement model demonstrates good convergent validity.

Discriminant validity is primarily utilized to determine whether theoretically distinct concepts are indeed unrelated, such that items used to measure distinct concepts are not determined to be correlated when no relation is expected to exist. Discriminant validity can be established by comparing the square root of Average Variance Extracted (AVE) for each concept with correlation coefficients between the specified concept and other concepts, as noted by Fornell and Larcker (1981).

Table 2 reports factor Load are range between 0.819 and 0.952. this follows the suggestion made by Hair et al. (2006) which indicates that the factor loading for every item should be 0.5 or higher, and ideally 0.7 or higher. It further reveals that reliability and aggregation validity test which indicates that the square root of an AVE of a construct is larger than its correlations with all other constructs, it demonstrates discriminant validity between the dimensions. CR indicates the incremental indices expected to higher than 0.9 (Fornell & Larcker, 1981). The table confirms that CR range between 0.914 and 0.950 indicates good test. Furthermore, Cronbach's α coefficient reveals a measure of internal consistency for a set of items in a test. The table reports Cronbach's α coefficient range between 0.882 and 0.938 indicates good test (Zhou, 2020).

Table 3 above shows that the differentiation among the lower-order variables within each higher-order construct in this study is low, which is expected because they all represent the same overarching construct. However, the correlation coefficients between lower-order variables from different higher-order constructs are all lower than the square roots of their respective AVE values, indicating that the higher-order constructs exhibit solid discriminant validity. Discriminant validity ensures that items measuring different constructs do not correlate when no relationship is theoretically expected. To further examine potential multicollinearity, the Variance Inflation Factor (VIF) was assessed. All VIF values were found to be below 3.0, with the highest value being 1.359, suggesting that multicollinearity is not a concern in this study.

Table 2. Reliability and aggregation validity test.

Scale	Dimension	Measured Item	Factor Load	AVE	CR	Cronbach's α Coefficient
DTC	PC	PC1	0.952	0.731	0.950	0.938
		PC2	0.846			
		PC3	0.862			
		PC4	0.819			
		PC5	0.835			
		PC6	0.839			
		PC7	0.825			
	OZ	OZ1	0.844	0.699	0.942	0.928
		OZ2	0.826			
		OZ3	0.839			
		OZ4	0.833			
		OZ5	0.838			
		OZ6	0.833			
		OZ7	0.840			
	RT	RT1	0.852	0.715	0.946	0.934
		RT2	0.839			
		RT3	0.861			
		RT4	0.847			
		RT5	0.836			
		RT6	0.843			
		RT7	0.841			
OSI	LFH	LFH1	0.952	0.774	0.945	0.926
		LFH2	0.875			
		LFH3	0.857			
		LFH4	0.857			
		LFH5	0.853			
	BSC	BSC1	0.835	0.716	0.926	0.901
		BSC2	0.859			
		BSC3	0.848			
		BSC4	0.836			
		BSC5	0.852			
	RL	RL1	0.861	0.734	0.932	0.909
		RL2	0.857			
		RL3	0.856			
		RL4	0.851			
		RL5	0.858			
DL	DTCR	DTCR1	0.924	0.733	0.932	0.908
		DTCR2	0.835			
		DTCR3	0.831			
		DTCR4	0.845			
		DTCR5	0.841			
	DRC	DRC1	0.845	0.690	0.917	0.887
		DRC2	0.819			
		DRC3	0.830			
		DRC4	0.826			
		DRC5	0.833			
	DEE	DEE1	0.832	0.679	0.914	0.882
		DEE2	0.803			
		DEE3	0.827			
		DEE4	0.832			
		DEE5	0.826			
	DCP	DCP1	0.833	0.684	0.916	0.885
		DCP2	0.830			
		DCP3	0.831			
		DCP4	0.829			
		DCP5	0.814			

Table 2. *Cont.*

Scale	Dimension	Measured Item	Factor Load	AVE	CR	Cronbach's α Coefficient
FP	RLR	RLR1	0.933	0.749	0.937	0.916
		RLR2	0.849			
		RLR3	0.844			
		RLR4	0.850			
		RLR5	0.847			
	EI	EI1	0.839	0.709	0.924	0.897
		EI2	0.843			
		EI3	0.847			
		EI4	0.845			
		EI5	0.836			
	EF	EF1	0.844	0.710	0.925	0.898
		EF2	0.834			
		EF3	0.846			
		EF4	0.847			
		EF5	0.843			
	ST	ST1	0.841	0.713	0.925	0.899
		ST2	0.856			
		ST3	0.833			
		ST4	0.841			
		ST5	0.851			

n = 620, Source: authors.

Table 3. Discriminative validity test based on Fornell-Larcker criterion.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
PC(1)	**0.855**													
OZ(2)	0.941 **	**0.836**												
RT(3)	0.940 **	0.931 **	**0.846**											
LFH(4)	0.432 **	0.410 **	0.429 **	**0.880**										
BSC(5)	0.422 **	0.402 **	0.411 **	0.919 **	**0.846**									
RL(6)	0.434 **	0.407 **	0.421 **	0.917 **	0.918 **	**0.857**								
DTCR(7)	0.398 **	0.375 **	0.388 **	0.372 **	0.364 **	0.364 **	**0.856**							
DRC(8)	0.399 **	0.383 **	0.403 **	0.385 **	0.372 **	0.367 **	0.890 **	**0.831**						
DEE(9)	0.416 **	0.400 **	0.413 **	0.366 **	0.359 **	0.357 **	0.901 **	0.881 **	**0.824**					
DCP(10)	0.374 **	0.358 **	0.369 **	0.366 **	0.362 **	0.352 **	0.897 **	0.890 **	0.888 **	**0.827**				
RLR(11)	0.431 **	0.417 **	0.420 **	0.364 **	0.350 **	0.333 **	0.377 **	0.364 **	0.372 **	0.364 **	**0.865**			
EI(12)	0.427 **	0.417 **	0.416 **	0.369 **	0.354 **	0.338 **	0.388 **	0.373 **	0.388 **	0.376 **	0.914 **	**0.842**		
EF(13)	0.431 **	0.425 **	0.420 **	0.367 **	0.345 **	0.338 **	0.399 **	0.383 **	0.407 **	0.401 **	0.904 **	0.899 **	**0.843**	
ST(14)	0.434 **	0.419 **	0.426 **	0.372 **	0.352 **	0.339 **	0.377 **	0.371 **	0.380 **	0.369 **	0.901 **	0.901 **	0.888 **	**0.844**

** $p < 0.01$. The diagonal bold value is the square root of AVE. n = 620, Source: authors.

4.4. Hypothesis Testing

In the structural equation analysis, the Structural Equation Modeling (SEM) technique was employed using SmartPLS 4.0 to test the research hypotheses (C. M. Wu & Chen, 2018). The evaluation of the model's statistical significance was based on the path coefficient (β), T-statistic (t), and *p*-value (p) (Cohen, 2013). In addition, the coefficient of determination (R^2) and effect size (f^2) were used to assess the explanatory power and practical significance of the model, respectively.

The coefficient of determination (R^2) is used to assess the predictive power of the structural model, with values ranging from 0 to 1. Higher R^2 values indicate stronger predictive ability. As shown in Table 4, the R^2 value for organizational strategic intuition (OSI), an endogenous variable in the model, is 0.194, suggesting that 19.4% of the variance in OSI is explained by the model. The R^2 value for digital leadership (DL) is 0.227, indicating that the model accounts for 22.7% of the variance in DL. Finally, the R^2 value for firm performance (FP) is 0.283, meaning that 28.3% of the variance in FP is explained by the model. These values point out that the model has moderate predictive power across the key endogenous variables.

Table 4. Results of model R-squared test.

Variables	R^2	Adjusted R^2
OSI	0.194	0.193
DL	0.227	0.225
FP	0.283	0.280

n = 620, Source: authors.

The effect size (f^2) is an important index used to evaluate the extent to which an independent variable contributes to the explanation of a dependent variable within Structural Equation Modeling (SEM). It helps to assess the relative influence of exogenous variables on endogenous latent variables. According to Cohen's criteria, an f^2 value greater than 0.02 is considered sufficient to indicate a meaningful effect size (Hult et al., 2018). As displayed in Table 5, all f^2 values in the model exceed the 0.02 threshold, indicating that the exogenous variables have a satisfactory explanatory effect on their respective endogenous variables. The effect size (f^2) is an important index used to evaluate the extent to which an independent variable contributes to the explanation of a dependent variable within Structural Equation Modeling (SEM). It helps to assess the relative influence of exogenous variables on endogenous latent variables. According to Cohen's criteria, an f^2 value greater than 0.02 is considered sufficient to indicate a meaningful effect size (Hult et al., 2018). As displayed in Table 4, all f^2 values in the model exceed the 0.02 threshold, indicating that the exogenous variables have a satisfactory explanatory effect on their respective endogenous variables.

Table 5. Test results of model F square.

Variables	OSI	DL	FP
DL	-	-	0.058
DTC	0.241	0.095	0.082
OSI	-	0.071	0.027

n = 620, Source: authors.

These R^2 measures signify that the model accounts for variation of 19.4% in organizational strategic intuition (OSI), 22.7% in digital leadership (DL), and 28.3% in enterprise performance (FP). While the measures represent a moderate extent of explanatory power, they are acceptable in exploratory research and behavioral studies, particularly in dynamic organizational settings with multi-dimensional platforms and outside forces that cannot be fully controlled. In addition, the primary purpose of the current study is exploratory verification and theory building, not prediction accuracy. As such, a comparatively moderate R^2 will not invalidate the model.

While the R^2 values are not strong, both the reliability and validity of the measurement model are satisfactory, and the effect sizes affirm the explanatory model of the theoretical model. This level of reliability is to be anticipated in complicated behavioral research and substantiates the conceptual model used in the current study. These R^2 values show that the model accounts for 19.4% variance in organizational strategic intuition (OSI), 22.7% variance in digital leadership (DL), and 28.3% variance in enterprise performance (FP). Though these values reflect a moderate explanatory power, they are tolerable in exploratory and behavioral studies, particularly in intricate organizational settings with multi-dimensional structures and environmental factors that could not be totally controlled. Moreover, the overall purpose of the present research is theoretical construction and exploratory validation rather than predictive fit. Thus, a comparatively modest R^2 would not change the model's validity.

Despite low R^2 values, the measurement model's reliability and validity are strong, and effect sizes validate the explanatory structure of the theoretical model. The expectation in complex behavior research is congruent with this, and it validates the conceptual model of this study.

To evaluate the relationships between the constructs in the model, a path coefficient analysis was conducted using the bootstrap resampling technique, as recommended by Preacher and Hayes (2008). The bootstrap procedure was performed with a sample size of 5000 and a 95% confidence interval. As depicted in Table 6, the results support a significant positive relationship between digital transformation capability (DTC) and firm performance (FP), with a path coefficient of $\beta = 0.283$ and a *p*-value less than 0.05. This indicates that DTC has a strong positive impact on FP.

Table 6. Testing of relationships in structural models.

Relationship	b	SE	t	P
H1 DTC → FP	0.283	0.043	6.641	0.000

n = 620, Source: authors.

The results indicate that all examined paths are statistically significant at the 5% significance level, with *p*-values less than 0.05, thereby confirming the validity of the proposed hypotheses. Specifically, digital transformation capability (DTC) has a significant positive effect on firm performance (FP), providing empirical support for Hypothesis H1. The structural equation model output illustrating the results of hypothesis testing is presented in Figure 1.

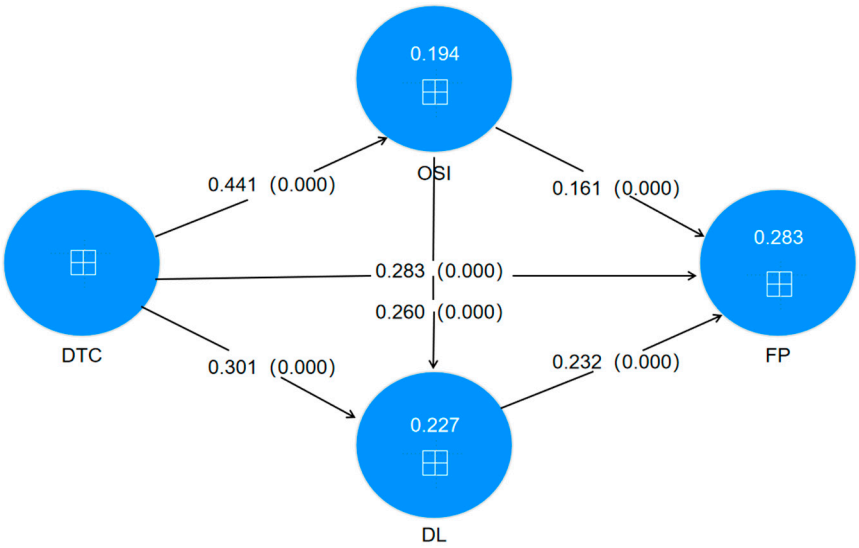


Figure 1. Path diagram. Source: authors.

To test the mediating effects in this research, the procedure proposed by Preacher and Hayes (2008) was followed. According to this approach, a statistically significant mediating effect is present if the confidence interval between the lower bound (BootLLCI) and the upper bound (BootULCI) does not include zero. As shown in Table 7, the analysis results support the presence of several significant mediating effects. For the path DTC → OSI → FP, the mediating effect of Organizational Strategic Intuition (OSI) is 0.071, with a *p*-value less than 0.05. The 97.5% bias-corrected confidence interval is [0.036, 0.109], which does not include zero, indicating a statistically significant mediating effect. Therefore, Hypothesis H2 is supported.

Table 7. Mediation effect test.

	b	SE	t	*p*	2.50%	97.50%
H2 DTC → OSI → FP	0.071	0.019	3.813	0.000	0.036	0.109
H3 DTC → DL → FP	0.070	0.016	4.414	0.000	0.042	0.104
H4 DTC → OSI → DL → FP	0.027	0.006	4.207	0.000	0.016	0.042

n = 620, Source: authors.

For the path DTC → DL → FP, the mediating effect of digital leadership (DL) is 0.070, also with a *p*-value less than 0.05. The 97.5% bias-corrected confidence interval is [0.042, 0.104], which excludes zero, confirming the significance of the mediating effect. Thus, Hypothesis H3 is supported. For the chain mediation path DTC → OSI → DL → FP, the mediating effect involving both OSI and DL is 0.027, with a *p*-value below 0.05. The 97.5% bias-corrected confidence interval is [0.016, 0.042], which does not include zero, indicating a significant chain mediating effect. Therefore, Hypothesis H4 is supported.

Among the direct and indirect paths of the analysis, the direct impact of digital transformation capability (DTC) on firm performance (FP) is the most significant ($\beta = 0.283$, $t = 6.641$, $p < 0.001$), which has extremely strong statistical significance. It indicates that in the current digital economy environment, the ability of digital transformation remains a key variable driving the improvement in firm performance.

Meanwhile, digital transformation capability (DTC) also indirectly affects firm performance (FP) through two mediating paths: namely, the path through organizational strategic intuition (OSI) ($\beta = 0.071$) and the path through digital leadership (DL) ($\beta = 0.070$). Although the coefficients of these two paths are slightly lower than those of the direct path, they still have statistical significance. It is worth noting that the chain mediation of DTC→OSI→DL→FP has a path coefficient of $\beta = 0.027$, which also meets the significance standard. The existence of this chain effect indicates that digital transformation capability (DTC) enhances an organization's strategic intuition (OSI), thereby promoting digital leadership (DL) and ultimately leading to an improvement in firm performance (FP). This confirms the cascading transmission mechanism among potential constructs and expands the understanding of the role of mediating variables.

The research evidence shows digital transformation capability leads to enhanced performance results for high-tech enterprises located in China's Yangtze River Delta, and this finding matches earlier studies (Ma et al., 2023; Pan et al., 2021; Sousa-Zomer et al., 2020; Wei & Zong, 2021). Within China's high-tech industry, digital transformation capability stands as a vital dynamic capability that helps organizations adjust and create innovative solutions in a digital world. Enterprises can meet external environmental changes efficiently through this capability, which also enables resource integration and strategic modification. The combined impact of these functions leads to better firm performance while enabling organizations to establish lasting competitive advantages in dynamic market environments.

The research demonstrates partial mediation functions of organizational strategic intuition, together with digital leadership, between digital transformation capability and firm performance. Dynamic capability theory demonstrates that digital transformation capability functions as a fundamental enabler for enterprises to adjust to complicated and ever-changing market conditions. Firm performance improves significantly through resource integration and strategic adjustment facilitated by this capability (Teece, 2007). Previous research (Songkajorn et al., 2022) has identified that organizational strategic intuition equips managers with rapid identification skills for market opportunities and risks, which leads to better decision-making processes and improved firm performance. This research confirms our understanding because it shows that developing strategic intuition through digital transformation capabilities leads to better performance outcomes. The upper echelons theory asserts that organizational strategies depend on the cognitive abilities and

decision-making skills of top leaders whose actions then affect firm performance (Hambrick & Mason, 1984). Leaders in digital environments require strong digital awareness and strategic decision-making capacity to successfully manage digital transformation. This research confirms previous research (Dewi & Sjabadhyni, 2021; Mihardjo et al., 2019), which demonstrates that firms gain better resource allocation capabilities and stronger competitive positions through digital leadership enhancement, leading to better performance outcomes in complex environments. Digital transformation capabilities enhance leadership abilities in data-based decision-making and strategic execution, alongside innovation management and digital leadership, leading to better firm performance.

Importantly, this research has identified a cascading effect between organizational strategic intuition and digital leadership. The improvement in digital transformation ability can enhance the organizational strategic intuition of enterprises and enable managers to have stronger market insight and strategic judgment. Organizational strategic intuition further strengthens digital leadership and enables managers to make and implement more forward-looking decisions in the process of digital transformation. Digital leadership translates organizational strategic intuition into digital innovation and changes at the enterprise level, which together contribute to the improvement in sustainable firm performance.

5. Discussion

This research further explores the relationship between digital transformation capability (DTC) and firm performance (FP) of Chinese Yangtze River Delta high-tech firms. In contrast with previous studies that were primarily concerned with the direct relationship between digital transformation and implications for performance (e.g., Ma et al., 2023; Pan et al., 2021; Sousa-Zomer et al., 2020; Wei & Zong, 2021), the present work diversifies its scope by empirically confirming the chain-mediating effects of organizational strategic intuition (OSI) and digital leadership (DL). The results reveal not only that DTC directly has a significant impact on FP but also indirectly facilitates it by sequentially activating OSI and DL. In contrast to the earlier findings that investigated intermediary variables OSI or DL separately, the present study provides an integrated perspective, showcasing how the intuitive formulation of strategy and adaptive leadership co-evolution has a synergistic channel for enhancing high-tech business performance. This finding is extremely advantageous in guiding the manner in which firms can become more competitive during the digital era.

The research is also enriched by its concentration on one of China's economically most vibrant and technologically most advanced regions—the Yangtze River Delta. The area has globally impactful innovation centers such as Shanghai, Hangzhou, Suzhou, and Nanjing with highly clustered industrial concentrations, advanced digital infrastructure, and highly advanced manufacturing systems. It harbors a high number of highly competitive high-tech enterprises and prioritizes green development according to national eco-efficiency goals (Wichai-utcha et al., 2019). In such an environment, digital transformation programs can enhance environmental performance and resource productivity. The research identifies that the companies working in this innovation environment can enhance their performance further by incorporating DTC as an OSI component and enhancing DL. In this manner, the research discloses how the dynamic interaction between the regional innovation system and firm organizational capabilities unleashes better firm performance.

In practice, the current study emphasizes the need to integrate DTC in the strategic core design of high-tech firms. With faster digitalization and increasing environmental challenges, the increased integration of DTC enhances company performance and market competitiveness. Moreover, this study emphasizes that the creation of OSI and DL facilitates companies to formulate better sustainability approaches. This double approach not only

optimizes production, management, and innovation processes but also positions firms in a strategic way to react to increasing market demands for green products and services.

The results have significant policy implications. Because the rate of technological progress is rapid, while competition in the high-tech industry is intense, companies need to innovate on a regular basis to be ahead of the competition. Policymakers must then come up with enabling policies that increase companies' DTC, promote the evolution of the digital economy, and establish a favorable business environment for digital adaptation and innovation. Furthermore, government departments need to focus on building leadership skills, especially among the managers who will supervise the digital projects. OSI and DL enhancement among managers prepares them to oversee and guide the digital transformation process efficiently. Through these initiatives, high-tech firms are aligned with national agendas for sustainability and can contribute more effectively to society's well-being. Last but not least, strategic leadership and policy advocacy to promote digital transformation can deliver more equitable and sustainable performance results.

In general, this research is highly applicable to academic discussion and managerial action. This study proves that high-tech companies can obtain managerial innovation and sustainable performance by improving their DTC, OSI, and DL. The changing digital economy, which serves as a leading model of economics, has far-reaching consequences for the complex relationship between firm performance and market competitiveness, particularly in terms of management innovation within the framework of global sustainable development goals.

6. Conclusions

This present study has several salient findings. First, digital transformation capability has positive and significant impacts on firm performance. Second, apart from its direct impact, digital transformation capability also contributes to firm performance indirectly by raising organizational strategic intuition. Third, digital leadership is an essential mediator for the link between digital transformation capability and firm performance. Lastly, a chain mediation effect—where both organizational strategic intuition and digital leadership act synergistically—also drives the performance outcomes of digital transformation initiatives.

Although this current study offers useful evidence regarding the influence of high-tech companies' digital transformation ability, organizational strategic intuition, and digital leadership on firm performance, some limitations indicate directions for future research. To begin with, this study examines high-tech companies within the Yangtze River Delta region in China, assuming such companies are representative, or even if they are, geographic variations in economic development, policy support, and the degree of industrial digitalization may influence the outcome. Future research could take the analysis to other regions, e.g., the Guangdong–Hong Kong–Macao Greater Bay Area and Pearl River Delta, to increase the generalizability of results between contexts.

Second, this study only analyzes three variables—digital transformation capability, organizational strategic intuition, and digital leadership—as causal factors of firm performance. Other variables that might be causes of performance results could be explored in subsequent research. Third, the use of cross-sectional data restricts the strength of causal inferences. Since digital transformation is dynamic and stepwise in nature, subsequent studies can utilize panel data or longitudinal designs to measure the evolution of firms' digital transformation capability, strategic acumen, and digital leadership over time. Such study designs would enable more investigation of causal effects and mechanisms that underlie the performance effects of digital transformation for firms.

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