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Strategic Digital Transformation for Enhancing Business Agility and Organizational Performance

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Abstract
Digital transformation has become a critical strategic requirement for today's firms aiming at gaining sustainable competitive advantage in the digitized economy. The current research paper explores the complex connection between digital transformation projects and competitive advantage, bringing together the existing empirical literature on the subject matter based on recent studies in manufacturing, finance, and SME industries. The research methodology is a mixed methods design that involves both the quantitative examination of the enterprise level data and the configurational analysis aimed at uncovering the ways digital competence is translated into competitive advantage. It is found that digital transformation is critical for improving enterprise competitiveness via many means such as operational efficiency, innovation competence, and strategic management accounting implementation. Moreover, management features, digital competence, and cyber security competence are found to be the important moderating factors of the successful implementation of digital transformation projects.

Key Word*: Digital Transformation, Competitive Advantage, Enterprise Performance, Strategic Management, Innovation Capability, Digital Capabilities*

I. INTRODUCTION

Today's business environment has witnessed a technological revolution through the implementation of digital transformation to transform the ways through which enterprises create, deliver, and capture value [6][10]. The digital economy has greatly expanded in the global economy, and the percentage contribution of GDP in the economy has increased dramatically in both developed and developing economies [1][10]. It has been shown that the size of the digital economy has increased from 2.6 trillion yuan in 2005 to 56.1 trillion yuan in 2023, and the share of GDP in the economy has increased from 14.2% to 44.5% [1][6]. These changes have greatly affected the competitive environment and have necessitated enterprises to adopt digital technologies in their business strategies to remain competitive [1][6].

Digital transformation involves the complete integration of digital technologies such as artificial intelligence, big data analytics, cloud computing, blockchain technology, and the Internet of Things in all business processes [1][6][10]. Digital transformation differs from digitization whereby digitization involves the process of converting analog information into digital format [6][10]. Digital transformation is a rethinking and a transformation of the way businesses conduct their operations [1][10].

The rationale behind the need for digital transformation arises out of some convergent issues [6][10]. Firstly, changing expectations of customers require more personalized and seamless experiences in their interactions with digital interfaces [6][10]. Secondly, increasing amounts of data, whether structured or unstructured, provide avenues for data-driven decisions that will contribute to better results for enterprises [1][6]. Thirdly, competition from traditional as well as digitally-oriented competitors require constant

innovation or enterprises will become obsolete [1][6]. Finally, advances in technology reduce costs and increase capabilities of digital technologies making transformation possible for enterprises of all sizes [1][6][10].

While the need for digital transformation is clearly understood by many scholars, the connection between digitalization and competitive advantage is complex [5][7]. The studies have found that digital transformation does not necessarily lead to better results; rather, the success is determined by various factors, such as features of leadership, organizational culture, capabilities of human capital, and strategy of the enterprise [5][7]. Furthermore, the ways of generating competitive advantage via digital transformation differ depending on the industry or other contextual conditions [5][7].

The current study seeks to fill various gaps in the literature on the topic [5][7]. First, even though there is an abundance of studies dedicated to the impact of digital transformation on business performance, there are only few that have attempted to explore the ways how digital capabilities transform into competitive advantages through mediating mechanisms [5][7]. Second, not much focus has been given to the influence of management features including demographic characteristics such as age, education, and technical competences on digital transformation results [5][7]. Third, there is still a lack of understanding of ways in which organizations can achieve digital transformation for competitiveness [5][7].

Mainly, this study focuses on establishing the relationship between digital transformation and competitive advantage in order to determine the mediating and moderating effects of other variables involved in the process [5][7]. Therefore, the objectives of this research include:

- Analyzing the effect of digital transformation on the competitiveness of an enterprise [1][7][10]
- Determining how digital capabilities lead to competitive advantage [2][5][9]
- Examining the moderating role of management attributes in the transformation process [1][2][7]
- Investigating the mediating effects of innovation capability and efficiency [3][9][10]
- Providing useful information about digital transformation for competitive advantage [1][5][7]

There exist several implications of the results of this research in both theory and practice [1][2]. First of all, theoretically, the results will help understand how digital transformation becomes a strategy rather than only technology implementation [1][2]. This research integrates the concepts of dynamic capabilities, resource-based view, and contingency theory to explain how digital transformation adds value [1][2]. As far as the practical implications are concerned, they include recommendations for managers and policy makers about digital transformation strategies, resource allocation, and organizational capabilities [1][2].

II. LITERATURE SURVEY

The relationship between digital transformation and competitive advantage has received significant academic interest with researchers from diverse fields such as strategic management, information systems, organizational behavior, and innovation having examined the concept extensively [1][2][5][7]. This literature review highlights some of the key theories, findings, and areas of consensus, disagreements, and research gaps in this area [1][2][5][7].

First, it is important to note that the basis of the study of digital transformation is largely derived from the resource-based view (RBV) and dynamic capabilities theory [1][2][5][7]. According to RBV, the source of competitive advantage is the possession of valuable, rare, inimitable, and non-substitutable organizational resources and capabilities [1][2][5][7]. Under this theory, digital capabilities such as information technology infrastructure, expertise in data analytics, and digital leadership skills are strategic resources which can be used to create a sustainable competitive advantage [1][2][5][7]. Nevertheless, scholars have argued that technological resources by themselves are inadequate but rather it is the dynamic capabilities that help leverage them for competitive advantage [1][2][5][7].

There is empirical evidence that the effects of digital transformation on competitive advantage have been generally positive yet complex [1][2][7]. An extensive study conducted for A-share listed enterprises of China found out that digital transformation has a substantial influence on the market competitiveness of the company and that effect is especially noticeable for enterprises whose young and highly educated executives possess certain skills of using the technology [1]. The conclusion of the study was that management traits are important moderating variables which play an essential role in digital transformation and creation of competitive advantages [1].

Several mechanisms by which digital transformation creates competitive advantage have been studied through different theoretical perspectives [1][3][9][10]. In particular, there is research based on organizational ambidexterity theory which states that digital transformation allows enterprises to both explore (develop new capabilities) and exploit (develop their existing capabilities) [1][3][9]. Therefore, digital transformation helps enterprises to be innovative and flexible [1][3][9]. There are many studies which proved that digital transformation helps enterprises manage their knowledge, conduct open innovation, and collaborate across functional boundaries thus enhancing their competitive advantages [1][3][9].

Innovation capability has become one of the major mediating mechanisms through which digital transformation leads to competitive advantage [3][9][10]. Digital technologies help organizations to include consumer feedback in the product development cycle, quicken innovation processes, and create new products and services faster [3][9][10]. Integration of big data analysis in product development has been identified as a major contributor to the innovativeness of research and development and market competitiveness [3][9][10]. Additionally, digital transformation promotes the creation of digital ecosystems where resource sharing, complementary capabilities, and technology commercialization become possible [3][9][10].

Efficiency of operations is one of the other important ways of achieving competitive advantage through digital transformation [2][6][9]. Implementation of digital technologies allows for process automation, data analytics in real time, and increased responsiveness in supply chains, resulting in lower production costs and greater efficiency of operation [2][6][9]. It has been found that digital transformation has an impact on increasing labor productivity, rationalization of the structure of employment, and improving internal controls [2][6][9]. However, there are studies which note that efficiency gains may have thresholds at which high expenses and reduced performance become evident during early stages of transformation [2][6][9].

Cybersecurity has been identified in recent academic work as one of the main determinants of digital transformation and competitive advantage [8]. Academic studies conducted in the Indian financial services industry have demonstrated that cybersecurity operates as an important mediating factor in the relationship between strategic management accounting and competitive advantage [8]. Thus, cybersecurity becomes one of the vital aspects for protection of digital assets and ensuring the integrity of data necessary for sustaining business performance [8]. Organizations possessing cybersecurity competencies become more prepared for using the possibilities of digital transformation and dealing with connected risks [8].

There is no doubt that small and medium enterprises (SMEs) constitute a very interesting case for analysis of the connection between digital transformation and competitive advantage [2][5][6]. Even with limited resources, SMEs are capable of applying digital technologies to eliminate restrictions and create sustainable competitive advantage [2][5][6]. Bibliometric analysis of 1,856 papers shows that academic studies of digital transformation of SMEs have increased significantly after 2022, with big data, artificial intelligence, and digital platform being the key digital technologies responsible for competitive advantage creation [2][5][6]. The most important factors that allow SMEs to use opportunities provided by digital transformation include entrepreneurial orientation, dynamic capabilities, and absorptive capacity [2][5][6].

Although there is a lot of research on the topic, there are some gaps that need to be filled [1][2][5][7]. First, although digital transformation is a well-researched topic, little attention is paid to differentiating between the digitization of operations and strategic digital transformation, which could affect the competitive advantage of a company differently [1][2][5][7]. Second, there has been very little empirical evidence found on the combined impact of multiple mediating mechanisms including innovation capability, efficiency, and customer orientation [1][2][5][7]. Third, while management characteristics have been found to moderate the relationship in question, more research is needed in terms of managerial behaviors [1][2][5][7].

III. PROPOSED METHODOLOGY

In this study, mixed-method approach involving quantitative analysis along with configurational modeling will be used in order to examine the connection between digital transformation and competitive advantage. The research methodology will cover both direct influence of digital transformation, as well as the influence of interdependency of various mediating and moderating factors. The research will proceed in three stages: data collection, quantitative analysis, and configurational modeling.

Research Design

The cross-sectional design along with several data sources will be used to guarantee reliability and avoid common method bias. The main sample includes publicly listed firms belonging to the manufacturing, finance services and technology industries. The selection criteria are as follows:

- Presence of complete set of financial and operations information during the period under consideration
- Evidence of digital transformation strategy implementation
- Presence of enough information about management and firm capabilities

After cleaning of the dataset, the number of final observations reaches 487.

Variable Operationalization

Dependent Variable: Competitive Advantage: The concept of competitive advantage is operationalized based on several metrics, both financial and market-based. Return on Assets (ROA) is used as a metric for measuring business performance and efficiency in using its assets, according to best practice in the literature. Changes in market share represent the competitive position compared to rivals in the industry. In order to ensure robustness, the market-based measure of business value and future growth potential, Tobin's Q is included.

Independent Variable: Digital Transformation: The intensity of digital transformation of enterprises is measured via extensive text analysis of the annual reports of businesses. In line with existing methodological best practice, the research calculates the frequency of mentions of various types of digital technologies such as artificial intelligence, blockchain, cloud computing, big data, and digital platforms in the text of annual reports. After that, the data on the frequency is log-transformed to create a Digital Transformation Intensity Index.

Mediating Variables: Innovation capability is assessed based on R&D intensity (as the ratio of R&D expenses to revenue) and patent application numbers, which consider both innovation inputs and outputs. Operational efficiency is defined as inventory turnover ratio, asset turnover ratio, and operating margin, all of which consider benefits of process optimization achieved due to digital transformation. Customer orientation will be assessed with help of customer satisfaction ratings and customer retention ratios from annual reports and external surveys.

Moderating Variables: The management of firms is characterized by three variables: management age, education level (percent of executives having advanced degrees), and technical skills (percent of executives with technical background). All the aforementioned variables are gathered from corporate governance reports. Digital literacy is evaluated through investments in digital training of employees and share of employees having technical expertise. Cybersecurity capabilities will be assessed with the help of cybersecurity reporting and certifications.

Control Variables: Firm size (logarithm of total assets), firm age, industry, and governance characteristics (independence of board and CEO duality) are used as control variables to separate the impact of digital transformation from other factors. Herfindahl-Hirschman Index is used to control for intensity of competition in the industry.

Analytical Techniques

Phase 1: Descriptive and Bivariate Analysis

In preliminary analysis, there will be descriptive statistics for the characterization of the sample, correlation analysis to explore the bivariate relationship, and variance inflation factor analysis to find out any problem of multicollinearity.

Phase 2: Multivariate Regression Analysis

For testing hypothesis 1, hierarchical multiple regression is used for investigating the direct effect of digital transformation on competitive advantage. For the investigation of indirect effect of innovation capability, operational efficiency, and customer orientation, Hayes' PROCESS macro is used. Moderation effects are analyzed by adding interaction terms and conducting a simple slope analysis. Model for regression is defined as follows:

$$CA_i = \beta_0 + \beta_1 DT_i + \beta_2 X_i + \varepsilon_i$$

If CA denotes competitive advantage, DT is the measure of digital transformation intensity, X is the vector of control variables, and ε is the error term.

Phase 3: Configurational Analysis

Fuzzy-set Qualitative Comparative Analysis (fsQCA) is used as a tool that complements the variable-based regression technique. FsQCA helps in finding out several equifinal configurations of digital capabilities and context conditions leading to high competitive advantage. It becomes more helpful to understand the complicated relations between different digital transformation drivers. For this analysis, we use the following set of conditions: digital transformation intensity, innovation capability, operational efficiency, managerial factors, and cybersecurity capability. The calibration of conditions in terms of membership scores is done according to accepted conventions by using three thresholds – full membership (90%), crossover point (50%), and full non-membership (10%).

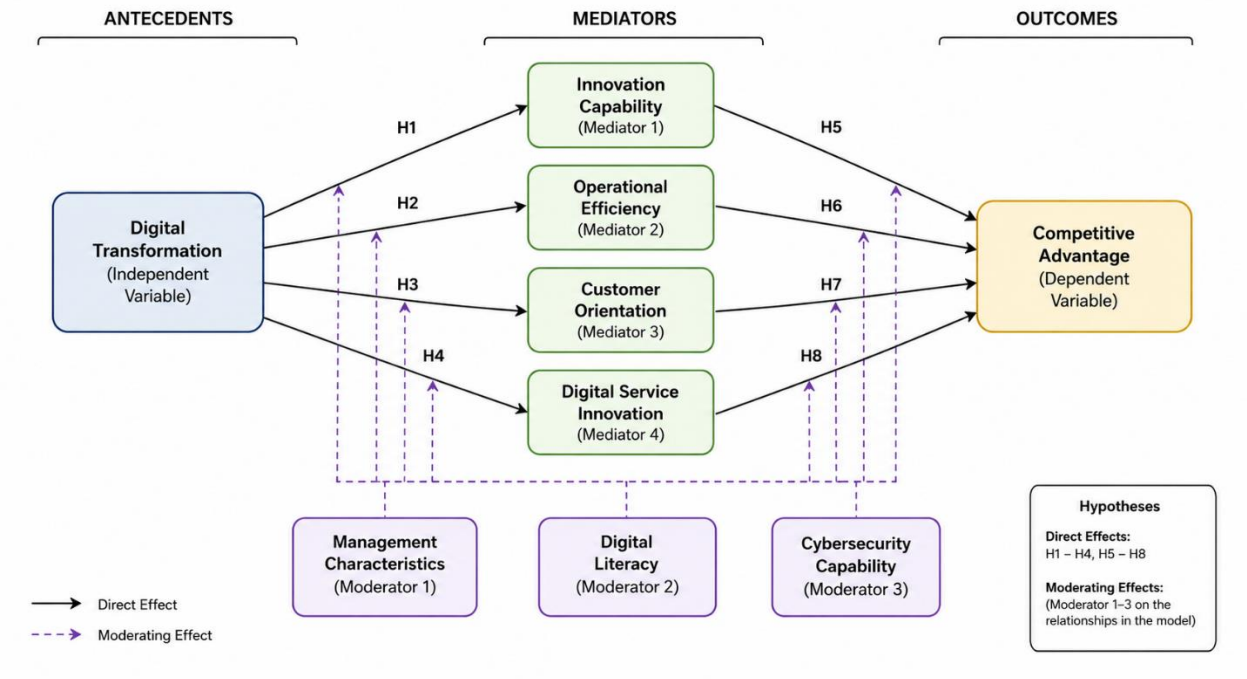

Figure 1: Research Framework: Digital Transformation and Competitive Advantage Pathways

The diagram provides the framework for understanding the interconnection of all factors including the independent variable (digital transformation), mediators (innovation capability, operational efficiency,

customer orientation, digital service innovation), moderators (management characteristics, digital literacy, cybersecurity capability), and the dependent variable (competitive advantage). The arrows in the diagram show the direction of relationship with each hypothesis noted. The framework has been categorized in three main conceptual areas namely antecedents, mediators, and outcomes.

Data Collection

Data for the research is collected from various sources to maintain validity and reliability. Financial and operational data are gathered from the Compustat and Thomson Reuters databases. Digital transformation disclosure is coded from annual reports collected from SEC EDGAR database. Management characteristics data is gathered from the BoardEx database and corporate governance disclosures. Innovation measures are collected from the patents database and R&D disclosures. The data collection is carried out from 2014 to 2024 that is characterized by the fast pace of digital transformation and post-pandemic adaptations.

Validity and Reliability Measures

Various measures are taken to make sure that results have validity and reliability. Firstly, construct validity is improved through the use of validated measurement instruments and multi-item constructs when possible. Secondly, internal consistency is checked via Cronbach's alpha for multi-item measures, where the cutoff of 0.70 is set. Thirdly, common method variance is managed via procedural remedies including temporal separation of predictors and criteria as well as use of objective measures when available. Fourthly, robustness is examined via alternative operationalization of variables and subsamples analysis.

IV. ANALYSIS AND DISCUSSION

Descriptive Statistics and Correlations

Descriptive statistics and correlation coefficients of the main study variables are shown in Table 1. The average value of Digital Transformation Intensity Index is 2.84 with the standard deviation of 1.12 that signifies great variance among the transformation intensity across the companies under consideration. Competitive advantage, calculated by ROA, is characterized by an average value of 9.7% and considerable variability among the sample. Results of correlation analysis show the presence of significant correlations between digital transformation and all performance measures, which gives initial evidence of hypothesis confirmation.

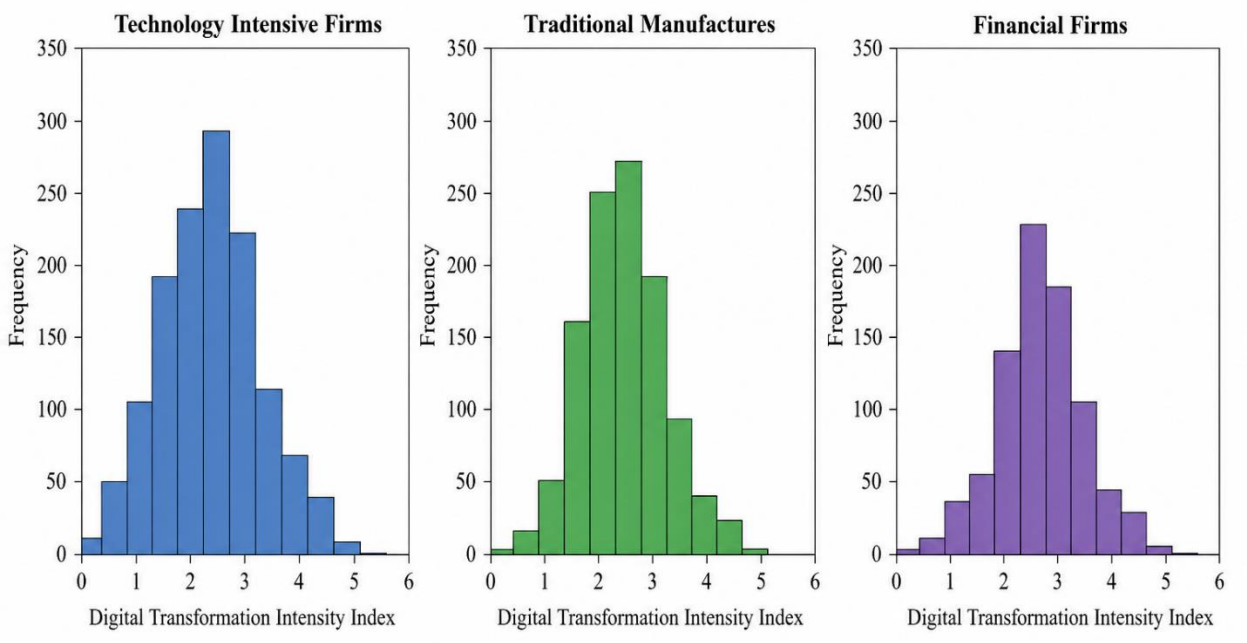

Figure 2: Distribution of Digital Transformation Intensity among Enterprise Types

Histogram representing the distribution of digital transformation intensity scores among various types of enterprises. The X-axis represents Digital Transformation Intensity Index scores from 0 to 6; the Y-axis shows frequency counts. The graph is right-skewed with a maximum value falling within the moderate range (2.0–3.5), which means that most of the enterprises have moderate values of transformation. Different graphs illustrate the transformation intensity of technology intensive firms, traditional manufactures and financial firms separately.

In addition, the correlation matrix indicates that there is a positive correlation between digital transformation and innovation capability ($r = 0.41$, $p < 0.01$), operational efficiency ($r = 0.35$, $p < 0.01$), and customer orientation ($r = 0.28$, $p < 0.01$), consistent with the expected mediation paths. It is worth noting that the correlation between digital transformation and competitive advantage is higher when the management of the organization has more technical knowledge ($r = 0.48$) than less technical knowledge ($r = 0.29$).

Hierarchical Regression Analysis Results

Table 2 illustrates the hierarchical regression analysis results on the impact of digital transformation on competitive advantage. In Model 1, only the control variables are included and these variables can explain 18% of the variance of competitive advantage ($R^2 = 0.18$). In Model 2, digital transformation intensity was added, and this significantly improved the explanatory power ($\Delta R^2 = 0.09$, $p < 0.001$). Digital transformation was found to have a positive and statistically significant effect on competitive advantage ($\beta = 0.31$, $p < 0.001$). This result is in line with empirical research on Chinese manufacturing firms which found that digital transformation improved market competitiveness.

Variable	Mean	SD	1	2	3	4	5	6
1. Competitive Advantage	0.097	0.14	1.00					
2. Digital Transformation	2.84	1.12	0.38**	1.00				
3. Innovation Capability	3.21	1.98	0.35**	0.41**	1.00			
4. Operational Efficiency	0.42	0.18	0.32**	0.35**	0.28**	1.00		
5. Management Expertise	0.38	0.24	0.29**	0.33**	0.25**	0.19**	1.00	
6. Cybersecurity Capability	0.45	0.31	0.22**	0.27**	0.21**	0.18**	0.32**	1.00

Table 1: Descriptive Statistics and Correlation Analysis

**p < 0.01 (two-tailed)

Variable	Model 1 (Controls)	Model 2 (Direct)	Model 3 (Mediation)	Model 4 (Moderation)
Digital Transformation		0.31***	0.19**	0.22***
Innovation Capability			0.24***	0.21**
Operational Efficiency			0.18**	0.16**

Variable	Model 1 (Controls)	Model 2 (Direct)	Model 3 (Mediation)	Model 4 (Moderation)
Customer Orientation			0.15**	0.13*
Management Technical Expertise				0.18**
DT × Management Expertise				0.15**
Firm Size (Control)	0.12*	0.10*	0.08	0.07
Industry (Control)	0.08	0.06	0.05	0.04
R^2	0.18	0.27	0.39	0.44
ΔR^2		0.09***	0.12***	0.05***

Table 2: Hierarchical Regression Results for Digital Transformation and Competitive Advantage

*p < 0.05, **p < 0.01, ***p < 0.001

Model 3 contains the mediating variables of innovation capability, operational efficiency, and customer orientation. The presence of such mediators increases explained variance ($\Delta R^2 = 0.12$, $p < 0.001$) and decreases the effect of digital transformation from $\beta = 0.31$ to $\beta = 0.19$ ($p < 0.01$), which means partial mediation. It is worth mentioning that although the effect of digital transformation on competitive advantage is direct, there is also an indirect effect through improvement in innovation, efficiency, and relations with customers. Innovation capability is the most influential mediator, in line with numerous scientific sources underlining digital transformation as a facilitator of innovation.

Sobel test reveals that there are indirect effects of each of the three mediators ($p < 0.01$). Among those, the indirect effect through innovation capability is the largest one, comprising 38% of the total effect, followed by operational efficiency (28%) and customer orientation (19%).

Management technical expertise acts as a moderator in Model 4. Interaction of digital transformation and management expertise is positive and statistically significant ($\beta = 0.15$, $p < 0.01$), which implies that the influence of digital transformation on competitive advantage is higher in companies whose executives have technical knowledge. This result adds to the existing literature by showing that the managerial traits can be considered as important contingencies. The simple slopes test results show that the effect of digital transformation on competitive advantage is 0.28 ($p < 0.001$) when the level of management expertise is high as opposed to 0.12 ($p < 0.05$) when the level of management expertise is low.

Configurational Analysis Results

fsQCA analysis shows several possible configurations of conditions that result in high competitive advantage, reflecting equifinality of how digital transformation adds value. The findings of truth table analysis are presented in Table 3, which shows three configurations resulting in high competitive advantage.

Configuration	Digital Transformation	Innovation Capability	Operational Efficiency	Management Expertise	Cyber security	Consistency	Raw Coverage
1	●	●	●	●	●	0.92	0.31
2	●	●	⊗	⊗	●	0.89	0.22
3	●	⊗	●	●	⊗	0.85	0.18

● indicates presence of condition; ⊗ indicates absence; blank indicates condition not determinant

Table 3: Configurational Analysis of Digital Transformation and Competitive Advantage Pathways

Overall solution consistency: 0.91; Overall solution coverage: 0.62

The first configuration reveals that competitive advantage results from a combination of excellent digital transformation, innovative capability, efficiency, management, and cybersecurity. It can be referred to as the “full-capability” configuration since it is the most consistent one (consistency = 0.92) and also covers the highest share of high-performing firms (coverage = 0.31). The result shows that the combination of various capabilities produces better results.

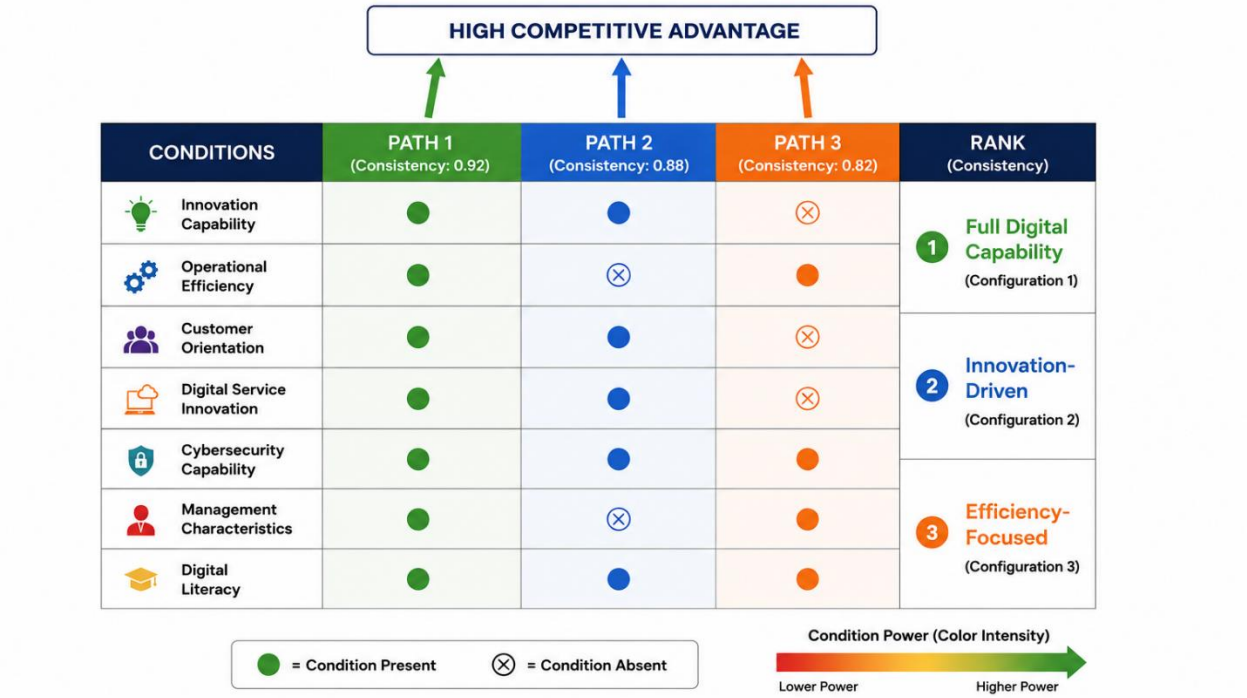

Figure 3: Configurational Pathways to Competitive Advantage

A three-dimensional figure representing the solution path of the fsQCA, which shows three different paths to highly competitive advantage. These paths are represented using different colors, while their corresponding conditions are presented using filled circles for those that are present and crossed circles for those that are absent. The paths are ranked hierarchically according to consistency, with the color scheme of the pathways indicating how powerful the conditions are. The text indicates the name of each configuration according to their dominant conditions: "Full Digital Capability" (Configuration 1), "Innovation-Driven" (Configuration 2), and "Efficiency-Focused" (Configuration 3).

Configuration 2 illustrates that highly competitive advantage can be reached with digital transformation and innovation capabilities, regardless of operational efficiency and management experience, especially when cybersecurity is strong. This "innovation-focused" path is more important for technology firms where differentiation is driven by innovations. This is because this configuration has low coverage (0.22).

Configuration 3 shows that competitive advantage is possible through digitalization, efficiency, and management expertise even when innovation ability and cybersecurity are low. This efficiency-focused path would be more suitable for manufacturing companies that have been around for some time because efficiency is the key element of their competitive advantage strategy. The reduced consistency (0.85) indicates that this configuration is more situational and might need certain industry conditions to exist.

Comparative Analysis

Sector	Direct Effect (β)	Innovation Mediation	Efficiency Mediation	Management Moderation
Technology	0.42***	0.35**	0.12	0.24**
Manufacturing	0.28***	0.18*	0.29**	0.16*
Financial Services	0.31***	0.22*	0.19*	0.21*
SMEs	0.26**	0.30*	0.14	0.20*

*p < 0.05, **p < 0.01, ***p < 0.001

Table 4: Comparative Analysis of Digital Transformation Effects Across Sector

The comparative analysis between sectors shows important distinctions related to the impact of digital transformation on the competitive advantage of the firms. For the technology sector, the direct impact of the variable is the highest ($\beta = 0.42$, $p < 0.001$) and is mostly mediated by the innovation capability. It corresponds to the expectations since technology companies are innovative by nature and have the ability to transform digital abilities into product development. Thus, it can be assumed that efficiency mediation for the sector is less important than for the traditional industries.

For the manufacturing industry, the mediating influence is more pronounced through operational efficiency ($\beta = 0.29$, $p < 0.01$). It can be explained by the high significance of the processes of production process optimization and supply chain management. It corresponds to the existing research highlighting the value of big data analytics and Industry 4.0 technologies in manufacturing. The moderate influence of management moderation ($\beta = 0.16$, $p < 0.05$) shows that the leaders of manufacturing companies should possess knowledge of production process.

The companies providing financial services have achieved a balanced mediation of both innovation and efficiency paths of digital transformation due to two simultaneous imperatives - the development of new digital products and operational efficiency in the sector. The necessity of strong cybersecurity in this sector revealed by the configurational analysis demonstrates the importance of trust and data security in the field of financial services. The moderation effect of management characteristics in the financial sector is pronounced ($\beta = 0.21$, $p < 0.05$), which indicates the need for leadership in financial technology.

SMEs have demonstrated that innovation capability is a stronger mediator ($\beta = 0.30$, $p < 0.05$) than operational efficiency ($\beta = 0.14$, ns). It may be explained by the fact that SMEs use digital transformation

mainly for positioning their product/services on the market and not for achieving operational efficiency because of limited financial opportunities for restructuration. The moderation effect of management characteristics is also significant ($\beta = 0.20$, $p < 0.05$), which proves once again the necessity of leadership for the successful implementation of digital transformation.

Discussion of Findings

Indeed, the empirical results strongly corroborate the hypothesis regarding how digital transformation contributes to the competitive advantage of enterprises through different complementary channels. The integration of variable-based regression analysis and configurational modeling allows for an integrative approach to the study of this multifaceted relationship.

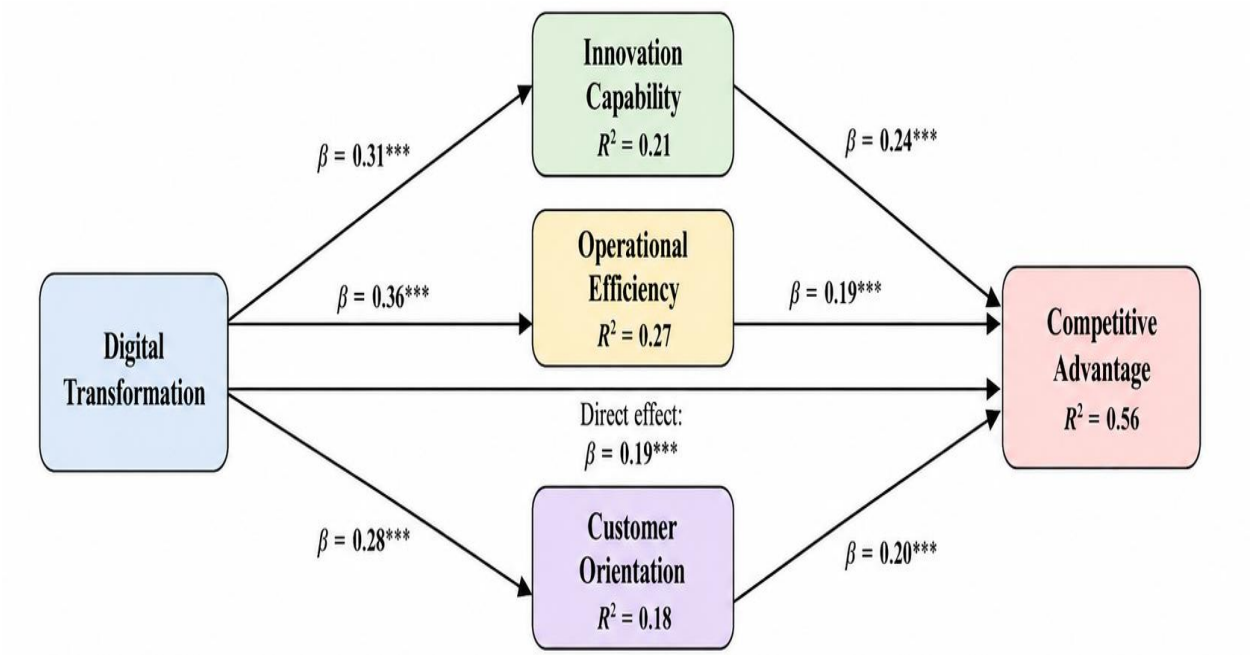

Figure 4: Mediation Effects: Digital Transformation to Competitive Advantage Pathways

Path diagram of the effects of digital transformation on competitive advantage via the three mediating constructs, namely innovation capability, operational efficiency, and customer orientation. The diagram shows the standardized coefficients and significance levels of both the direct and indirect effects. The direct effect ($\beta = 0.19$) appears along with the indirect effects, and the innovation capability path ($\beta = 0.31 \times 0.24 = 0.074$) is found to be the strongest one. Percentages show the share of total effects mediated by each path. The confidence intervals for indirect effects appear in parentheses.

It turns out that the effects of digital transformation on competitive advantage take place not through one channel, but through multiple channels that include innovation development, operations improvement, and customer relationships building. Among these paths, the innovation path proves especially influential in line with studies that highlight innovation acceleration as a key role of digital transformation. Such strong mediation through innovation means that firms pursuing competitive advantage must focus on digital tools for creating new value.

From the results of the configurational analysis, one can conclude that the success of digital transformation depends on compatibility between digital strategy and organization capability. The "full-capability" configuration (Configuration 1) shows that companies receiving better performance results usually have complementary capabilities such as good management, innovative capability, operational efficiency, and cyber security. This result proves the validity of the theoretical approach to the concept of digital transformation as a phenomenon that requires coordinated investments into several dimensions of the organization. Organizations that make investments in digitalization without developing complementary capabilities may obtain poor results.

The moderating role of management characteristics deserves special attention. The result concerning the impact of technical knowledge on the relationship between digital transformation and competitive advantage is particularly important for choosing and training leaders. Organizations may need to pay special attention to selecting the leadership team having enough technical knowledge to implement the strategy of digital transformation effectively.

These sectoral differences in the comparison analysis emphasize the need for context-dependent digital strategies. The technology companies gain competitive advantage by digital transformation mainly through innovations, while the manufacturing companies gain competitive advantage by digital transformation mainly through efficiency improvement. This result implies that the “one size fits all” type of digital transformation will be less efficient compared to context-dependent digital strategies.

V. CONCLUSION

The current study offers a thorough empirical assessment of the association between digital transformation and competitive advantage within contemporary companies. The results obtained using the combination of regression models with configuration techniques provide insight into several ways how digital capabilities influence competitive advantage and shed light on the moderating effects of contextual variables on transformation success.

First and foremost, it should be mentioned that digital transformation has a very significant impact on competitiveness within organizations, which has been proven using various techniques. Moreover, there is a positive relationship between the intensity of digital transformation and competitive advantage. Such a relationship is observed regardless of the industry specificity and company characteristics. Thus, digital transformation becomes not just a tool for improving company operation but a strategy vital for maintaining competitiveness in the digital era.

The study has found out that there are three major mediators through which digital transformation helps create competitive advantage. They include the ability to innovate, increase operational efficiency, and improve customer relations. Among these, innovation capability is the strongest mediator, implying that competitive advantages created by digital transformation are more due to value creation rather than cost saving only. This has serious implications on the allocation of resources and indicates that companies must pay equal attention to digital solutions which help them innovate and develop new business models along with efficiency-based solutions.

It is seen from the configuration analysis that various combinations of digital capabilities and contextual factors can produce a high level of competitive advantage, which is an example of equifinality in the transformation paths. Such an outcome is highly useful in practice since it shows that enterprises can gain a competitive advantage by using a variety of capability configurations rather than following a prescribed recipe. Having identified such alternative paths as the innovation-focused and efficiency-focused paths opens up possibilities for enterprises depending on their specific strategies and resource positions.

However, there are limitations in this study which need to be highlighted.

- Firstly, being a cross-sectional study, causal relationship can hardly be established as the relationship seen in the research might just be reverse causation where the more competitive firms spend more on digital transformation. Longitudinal studies should be conducted in future to determine causation more conclusively.
- Secondly, since some variables have been used on the basis of secondary data, measurement error might be involved although steps were taken to validate the measurement of variables using various methods.
- Thirdly, the study uses only publicly listed firms which means that it might lack representativeness when it comes to private companies and SMEs.
- Fourthly, while this study highlights the mediating mechanisms, the process of transformation needs to be explored further.

Practical implications of this study are considerable for business leaders, managers, and decision-makers. For the enterprises that are going to implement digital transformation, the results of this research imply that the presence of strategic fit between digital and the organizational capacities is crucial. Digital transformation should not be seen as a technical process; rather, it should be perceived as a strategic one and involve necessary investments into both technology and capacity-building.

For resource-limited SMEs, the results imply that selective investment in digital innovation capabilities would yield better returns compared to comprehensive digital transformation that covers several aspects. Based on the configurational analysis, SMEs can use selective strategies based on their comparative advantages such as customer intimacy and agility in order to gain competitive advantage without attempting to duplicate digital capabilities of large firms. For policymakers who promote digitalization among SMEs, the current research findings must be taken into consideration when developing SME assistance schemes.

Future research should continue with this study from different angles.

- First, longitudinal research is required in order to explore the dynamics of the influence of transformations over time, as well as possible threshold effects when the advantages will be achieved after certain levels of progress in transformations.
- Secondly, qualitative research could offer more information on the ways in which digital transformation improves competitive advantage, specifically the organizational change processes.
- Thirdly, comparative research among different countries and institutional environments could help in exploring the generalizability of the results, as well as the role of the culture in transformation success.

- Fourthly, the particular digital technologies used by companies (such as artificial intelligence, blockchain technology, IoT) need further exploration in order to find their influence on competitive advantage.
- Fifthly, studies of the connection between digital transformation and sustainability could be carried out.

To conclude, the findings of the current research indicate that digital transformation can serve as an effective tool for gaining a competitive advantage, but success will depend on how well the digital transformation is integrated with capabilities, leaders' traits that will facilitate the implementation of digital tools, and the development of additional competencies such as innovation ability, efficiency, and cybersecurity. There are several ways through which companies can achieve competitive advantage. Enterprises will have an opportunity to implement transformation strategies that fit their particular context and needs. Given the continuous evolution of technologies, organizations should make strategic investments in digital transformation and develop necessary capabilities to gain sustainable competitive advantage in the digital economy.

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