

Digital Transformation and Enterprise Performance: The Mediation Effect of Adaptive Capacity and the Moderating Effect of Entrepreneurship

Kela Zha ^{1, #, *}, Xinran Xie ^{2, #}

¹ School of Economics and Management, Harbin Institute of Technology, Harbin, China, 150001

² School of Economics, Shanghai University, Shanghai, China, 200444

* Corresponding Author Email: zhakela@outlook.com

#These authors contributed equally.

Abstract. In the context of a rapidly expanding global digital economy, a growing number of companies are undertaking Digital Transformation (DT) to enhance performance. This study adopts a dynamic perspective, develops a regression model with data from A-share listed firms covering 2011 to 2020, and examines the relationship between DT and Enterprise Performance (EP), as well as their underlying mechanisms. The findings reveal: (1) Benchmark regression analysis indicates that DT exerts a notably positive influence on EP. After conducting robustness checks and resolving endogeneity issues, this finding still proves robust. (2) Mediation effect tests reveal that DT significantly enhances EP through the mediating variable of Adaptive Capacity (AC), while Entrepreneurship (Entre) exerts a positive moderating effect on this relationship. (3) Heterogeneity analysis indicates that DT yields more pronounced performance improvements for enterprises in eastern regions and non-capital-intensive industries. Overall, this study delves into the intrinsic logical pathway of "DT-AC-EP" while examining the moderating role of Entre. It not only enriches existing research in this field but also offers new theoretical perspectives for related studies. These findings provide important theoretical guidance for enterprises seeking to accelerate their DT and enhance EP.

Keywords: Digital Transformation, Enterprise Performance, Adaptive Capacity, Entrepreneurship.

1. Introduction

As digital technologies keep advancing continuously and are widely adopted in enterprises, the digital economy wave is spreading all over the world. To drive the digital economy's development, governments worldwide have introduced relevant guiding policies. In 2023, the "Overall Plan for Building a Digital China" was released by the Central Committee of the Communist Party of China and the State Council, with the document stressing that building a Digital China functions as a crucial engine for advancing Chinese-style modernization. The plan also proposed establishing an integrated advancement framework by 2025. High importance is attached to the advancement of the digital economy in China, and efforts are made to promote the in-depth integration of digital technologies with the real economy. From a theoretical perspective, Digital Transformation (DT) is regarded as a key element in improving Enterprise Performance (EP). Through mechanisms such as improving investment efficiency and strengthening dynamic capabilities [1,2], DT has opened new pathways for enhancing EP.

Although there has been extensive attention on the influence of DT on EP, empirical research at present is still scarce. By reviewing existing literature, this paper finds numerous theoretical foundations exploring the relationship between DT and EP. Abu Alrub and Sánchez-Cañizares examined the relationship between dynamic capabilities and DT from a dynamic theory perspective, highlighting the role of digital maturity [3]. Wang et al. explored how digitalization influences innovation performance in manufacturing firms in emerging economies through dual innovation synergy, grounded in dual innovation synergy theory [4]. Song and Chen argued from a social network theory perspective that a moderate size of entrepreneurial social networks is more conducive to promoting corporate DT [5]. Cheng and Yang from a strategic flexibility theory perspective,

indicate that strategic flexibility plays a crucial role in whether enterprises can successfully achieve business model innovation and enhance performance [6]. Even though a few studies have uncovered the mediation role of dynamic capabilities in the link between DT and EP [2], there's an absence of thorough investigation into the specific aspects of dynamic capabilities, especially Adaptive Capacity (AC). Thus, studying the relationship between DT and EP from a dynamic perspective is of practical importance.

Given that the definition of AC emphasizes a firm's capacity to seize business opportunities during market expansion [2], this study utilizes data from Chinese A-share listed companies over the 2011–2020 period to investigate the influence of DT on EP from a dynamic perspective. It further investigates the underlying mechanisms of this impact and proposes relevant policy recommendations to assist enterprises in steadily advancing their DT and enhancing performance. Several contributions of this paper can be summarized as follows: First, adopting a dynamic theoretical perspective, it explores the impact mechanisms of DT on EP, revealing two key pathways—AC and Entrepreneurship (Entre)—thereby adding to the theoretical research concerning the relationship between DT and EP. Second, it empirically tests the influence of DT on EP and its underlying mechanisms, particularly the mediation effect of AC. This provides robust empirical support for understanding how DT enhances EP by improving organizational adaptability. Third, it investigates the impact of DT on EP in different regions and among firms with diverse factor intensities, providing empirical evidence to facilitate the formulation of customized policies and differentiated strategies for promoting corporate DT.

2. Theoretical Analysis and Research Hypotheses

2.1. Digital Transformation and Enterprise Performance

EP measures a company's capability and outcomes in achieving objectives under specific resources, conditions, and environments, closely tied to factors such as resource allocation, technological capabilities, production efficiency, and operational costs [1]. DT denotes the process through which enterprises or organizations utilize digital technologies—including big data, artificial intelligence, cloud computing, blockchain, and 5G—to shift from traditional business models to digital-based models, and in doing so, improve operational efficiency and quality [7]. Under the impetus of the current digital wave, the enhancement of EP no longer depends exclusively on traditional management approaches. Instead, DT has emerged as a vital strategy for enterprises to overcome development bottlenecks and strengthen their competitiveness.

Firstly, DT effectively breaks through resource constraints for enterprises. Traditional businesses are often limited by the finite nature of physical resources, making it difficult to achieve efficient resource utilization and rapid expansion. However, by introducing digital technologies, DT helps enterprises overcome physical resource limitations. Furthermore, it boosts the efficiency of resource utilization among multiple stakeholders across the upstream and downstream segments of industrial chains, thereby facilitating resource integration, convergence, and the enhancement of collaborative capabilities [8].

Secondly, DT significantly enhances a company's market AC. In rapidly changing market environments, enterprises must respond swiftly to market shifts and adjust strategies and products. By providing real-time data and analytical tools, DT enables companies to quickly capture market dynamics, promptly respond to changes, and innovate and upgrade products [9]. This rapid AC not only boosts market competitiveness but also directly enhances EP.

Thirdly, DT reduces transaction costs. It increases information transparency, lowers information search costs, and enables more precise insights into consumer demands [10]. This optimizes the direction of Research and Development (R&D), ensures new products better align with market needs, reduces new customer acquisition costs, and further drives EP improvement.

Drawing on the above theoretical analysis, this paper puts forward Hypothesis 1:
H1: Digital Transformation is positively correlated with Enterprise Performance.

2.2. The Mediation Effect of Adaptive Capacity

According to dynamic capability theory, AC—as a core component of dynamic capabilities—enables enterprises to swiftly identify and adapt to external environmental changes during DT [9]. By reconfiguring resources and processes to address uncertainty, AC theoretically serves as a mediating factor [2], thereby enhancing EP.

On the one hand, DT can enhance AC. DT represents a comprehensive, multidimensional transformation for enterprises. Enterprises are able to use digital technologies to thoroughly reshape their business models, operational processes, and other related aspects. Through the application of intelligent tools to design and provide support for product and technological innovations within the enterprise as well as its value chain [11], they can greatly enhance their ability to adapt to new environments. On the other hand, improved AC positively impacts EP. In an uncertain business landscape, the key to adapting to market changes lies in flexibly adjusting operational leverage. Businesses can increase leverage to seize market opportunities, expand production scale and market share, thereby achieving higher returns; alternatively, they can reduce leverage to cut costs and risks, strengthening resilience. DT enables managers to grasp market dynamics more precisely, allowing more effective utilization of operating leverage. As the utilization of operating leverage improves, the return on net capital also increases, amplifying the company's financial performance [2].

Leveraging the theoretical analysis discussed above, this paper advances Hypothesis 2:

H2: Adaptive Capacity mediates in the relationship between corporate Digital Transformation and Enterprise Performance.

2.3. The Moderating Effect of Entrepreneurship

Entre acts as a driving force behind economic development and exerts a notable impact on the practical results of DT [12,13]. DT is more than just a technological upgrade; it is an innovation practice fueled by entrepreneurial spirit.

First, the innovative drive of Entre motivates enterprises to actively investigate the application of digital technologies, overcome difficulties and obstacles during DT [14], and thereby enhance EP. This innovative drive manifests not only in technological breakthroughs but also in innovations to business models and management practices, which boosts corporate competitiveness and market AC. Second, Entre significantly improves company performance through its first-mover advantage and heightened sensitivity to weak signals. This heightened sensitivity enables enterprises to swiftly identify and seize new opportunities arising from DT, thereby gaining an edge in intense market competition. Finally, the innovative, risk-taking, and forward-looking nature of Entre directly propels enterprise growth [15], contributing to enhanced EP.

Taking the above theoretical analysis as a basis, this study proposes Hypothesis 3:

H3: Entrepreneurship functions as a positive moderator in the relationship between corporate Digital Transformation and Enterprise Performance.

See Figure 1 for the logical connection chart.

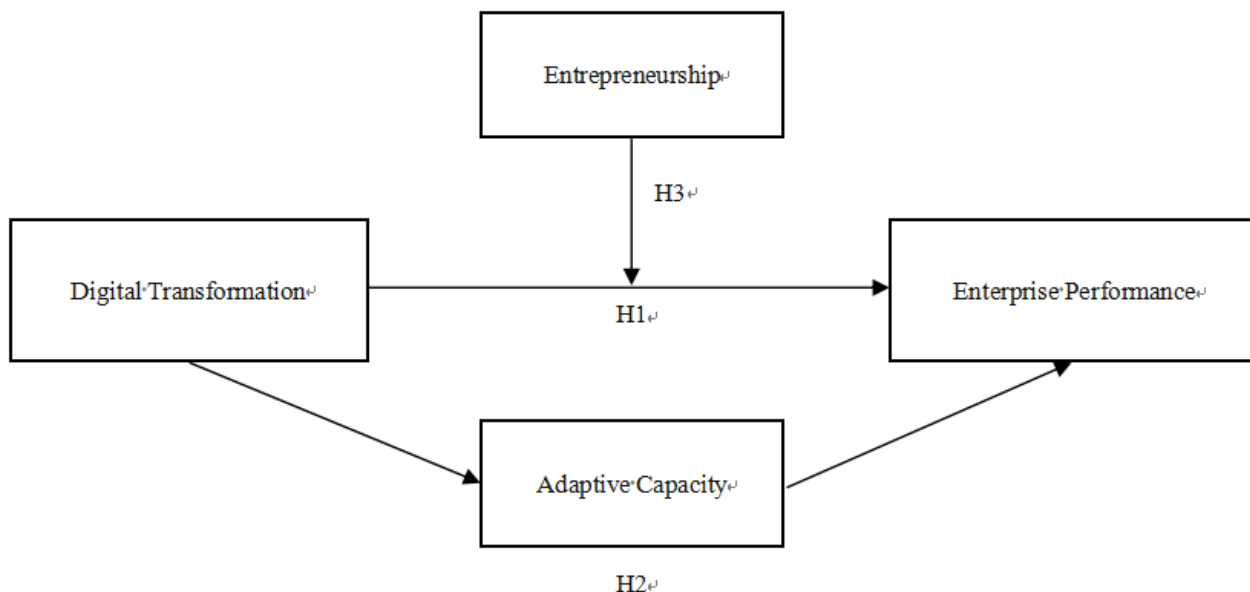


Figure 1. Logical Connection Chart

3. Research Design

3.1. Sample Selection and Data Sources

The initial research sample for this study comprises A-share listed companies spanning 2011 to 2020. Raw data undergo processing via these steps: (1) excluding financial and insurance industry-listed companies; (2) removing ST, *ST, or PT-classified samples; (3) weeding out samples that have missing data on key variables; (4) ruling out samples in which the debt-to-asset ratio goes beyond 1; (5) carrying out truncation on continuous variables at the 1st and 99th percentiles. Research variables are primarily sourced from the CSMAR database and Wind database, with additional data collected from multiple channels including company announcements, annual reports, and online platforms.

3.2. Variable Settings

3.2.1. Dependent variable

Enterprise Performance (EP). The approach adopted in this paper is that of Zhang et al. [16], who use Tobin's Q ratio to measure EP.

3.2.2. Explanatory variable

Digital Transformation (DT). The methodology employed in this paper is that used by Wu et al. [17], employing Python to analyze annual disclosure reports of A-share listed companies. It focuses on 76 digital terminology terms across domains like digital technology, artificial intelligence, big data, blockchain, and cloud computing, quantifying their frequency of occurrence. Based on this, a corporate digital terminology dictionary is constructed and extended to the Python Chinese word segmentation library to prevent proper nouns from being split. Finally, the corporate DT level is evaluated by first adding one to the occurrence frequency of these terms in annual reports and then calculating the logarithm of the resulting value.

3.2.3. Mediating variable

Adaptive Capacity (AC). Following the approach of Yang et al. [9], this study selects the coefficient of variation for three major annual expenditures—(R&D), capital, and advertising—as a metric to reflect the flexibility of corporate resource allocation. Since the coefficient of variation itself is inversely correlated with AC, this study adjusts it by taking the negative value. A higher adjusted coefficient of variation indicates stronger AC.

3.2.4. Moderating variable

Entrepreneurship (Entre). With reference to the method utilized by Li et al. [8], this study employs a comprehensive measurement approach using the entropy method to assess Entre. The indicators selected include the number of patent applications per enterprise, fixed assets per capita, income per capita, intangible assets per capita, and board independence.

3.2.5. Control variables

Referring to the study of Zheng and Shi [1], the variables selected for this paper are as follows: dual directorship (Dual), board size (Board), proportion of independent directors (Indep), top shareholder concentration (Top1), firm size (Size), leverage (Lev), liquid ratio (Liquid), cash flow (Cflow), and sales growth rate (Growth). Additionally, year (Year) and firm (Id) effects are controlled. The explicit descriptions of variables are outlined in Table 1.

Table 1. Variable Definitions and Descriptions

| Type | Name | Symbol | Definition and Description | Reference |
|----------------------|------------------------|--------|--|-------------------------|
| Dependent variable | Enterprise Performance | EP | Select Tobin's Q ratio as the metric, i.e., market capitalization divided by total assets. | Zhang et al., 2025 [16] |
| Explanatory variable | Digital Transformation | DT | The number of times relevant DT terms appear in the annual report is increased by 1 and then taken to the logarithm. | Wu et al., 2021 [17] |
| Mediating variable | Adaptive Capacity | AC | Negative coefficients of variation for the company's three major annual expenditures: R&D, capital, and advertising | Yang et al., 2020 [9] |
| Moderating variable | Entrepreneurship | Entre | A comprehensive measurement of Entre using the entropy method, incorporating indicators such as the number of corporate patent applications, fixed assets per capita, income per capita, intangible assets per capita, and board independence. | Li et al., 2021 [8] |

3.3. Model Construction

To test H1, this study establishes this below regression model for verification:

$$EP_{i,t} = \alpha_0 + \alpha_1 DT_{i,t} + \alpha_2 Controls_{i,t} + Year_{i,t} + Id_{i,t} + \epsilon_{i,t} \quad (1)$$

To test H2, drawing upon Wen and Ye research on mediation models [18], this study employs the three-step mediation path approach to construct the following model for empirical investigation:

$$AC_{i,t} = \beta_0 + \beta_1 DT_{i,t} + \beta_2 Controls_{i,t} + Year_{i,t} + Id_{i,t} + \epsilon_{i,t} \quad (2)$$

$$EP_{i,t} = \theta_0 + \theta_1 DT_{i,t} + \theta_2 AC_{i,t} + \theta_3 Controls_{i,t} + Year_{i,t} + Id_{i,t} + \epsilon_{i,t} \quad (3)$$

Within the models: EP is the dependent variable, DT is the explanatory variable, AC is the mediating variable, Controls are the control variables, Year_{i,t} and Id_{i,t} stand for the year fixed effects and firm fixed effects respectively, and ϵ is the random error term.

4. Empirical Analysis

4.1. Descriptive statistics

Table 2 presents descriptive statistics for the variables relevant to this study. The data indicate that the mean value for EP is 1.957, with a standard deviation of 1.112, a minimum value of 0.864, and a maximum value of 7.101. These statistics reveal significant dispersion in EP among the listed companies examined. For corporate DT, a mean of 1.397, a standard deviation of 1.411, a minimum value of 0, and a maximum value of 5.142 are observed. The data show that the sample enterprises, on the whole, have a relatively low level of DT; meanwhile, they also indicate clear heterogeneity across enterprises DT progress.

Table 2. Descriptive Statistics

| Variable | Obs | Mean | Std.Dev. | Min | Max |
|----------|-------|--------|----------|--------|--------|
| EP | 20007 | 1.957 | 1.112 | 0.864 | 7.101 |
| DT | 20007 | 1.397 | 1.411 | 0.000 | 5.142 |
| AC | 20007 | -1.124 | 0.348 | -1.732 | -0.270 |
| Entre | 20007 | 0.066 | 0.092 | 0.001 | 0.219 |
| Dual | 20007 | 0.298 | 0.457 | 0.000 | 1.000 |
| Board | 20007 | 2.132 | 0.195 | 1.609 | 2.708 |
| Indep | 20007 | 0.374 | 0.052 | 0.333 | 0.571 |
| Top1 | 20007 | 35.007 | 14.768 | 9.000 | 74.566 |
| Size | 20007 | 22.151 | 1.279 | 20.061 | 26.207 |
| Lev | 20007 | 0.389 | 0.194 | 0.049 | 0.826 |
| Liquid | 20007 | 2.793 | 2.904 | 0.363 | 18.424 |
| Cflow | 20007 | 0.053 | 0.064 | -0.125 | 0.230 |
| Growth | 20007 | 0.156 | 0.301 | -0.455 | 1.645 |
| East | 20007 | 0.737 | 0.440 | 0.000 | 1.000 |

4.2. Regression Analysis

Table 3 provides a detailed presentation of the outcomes derived from the multiple linear regression test for H1. Column (1) presents results from a specification that includes year and industry fixed effects but no control variables: the DT regression coefficient is 0.015, significant at the 10% level and positive in direction. Column (2) shows that when control variables are incorporated alongside the control of year and industry, the regression coefficient for DT is 0.031, which meets the 1% significance level standard. These results collectively provide evidence that DT exerts a significantly positive impact on EP, providing validation for Hypothesis 1 of this research.

Table 3. Benchmark Regression

| | (1) | (2) |
|----------------|----------|-----------|
| | EP | EP |
| DT | 0.015* | 0.031*** |
| | (1.806) | (3.667) |
| Board | | -0.071 |
| | | (-1.016) |
| Dual | | -0.047** |
| | | (-2.249) |
| Size | | -0.339*** |
| | | (-18.526) |
| Lev | | -0.012 |
| | | (-0.152) |
| Liquid | | -0.047*** |
| | | (-12.684) |
| Top1 | | -0.007*** |
| | | (-6.223) |
| Indep | | 0.272 |
| | | (1.278) |
| Growth | | 0.151*** |
| | | (7.753) |
| Cflow | | 1.249*** |
| | | (11.340) |
| _cons | 1.674*** | 9.411*** |
| | (81.246) | (22.089) |
| Year | Yes | Yes |
| Id | Yes | Yes |
| N | 20007 | 20007 |
| R ² | 0.226 | 0.260 |
| F | 493.141 | 313.063 |

t statistics in parentheses, ***p<0.01, **p<0.05, *p<0.10. The same applies to the following tables.

4.3. Robustness and Endogeneity Tests

4.3.1. Remove some control variables

After removing the two control variables—cash flow (Cflow) and sales growth rate (Growth)—the regression was rerun. The results continued to be positively significant at the 1% statistical significance level, which provides confirmation of the robustness of the benchmark regression outcomes.

4.3.2. Repeated Sampling Method

Drawing on the method used by Qi et al. [19], this study employs 300 repeated bootstrap samples for regression analysis. The results indicate that DT significantly boosts EP, which further confirms the robustness of the benchmark regression findings outlined in this study.

4.3.3. Instrumental Variables Method

When assessing the positive correlation between corporate DT and EP, it is essential to acknowledge potential issues of sample self-selection bias. To address potential estimation issues, this paper follows the research method of Wang et al. [20]: it selects the mean DT level in the same province-industry-year cluster as an instrumental variable, and applies the two-stage least squares approach for testing. As revealed by the first-stage regression, the instrumental variable exhibits a significantly positive association with corporate DT at the 1% significance level—consistent with the anticipated logical relationship. Turning to the second-stage estimation, the coefficient of corporate DT retains its statistical significance and positive direction. This result verifies that, even when sample selection bias is addressed, the positive relationship between DT and EP remains statistically significant.

4.4. Mediation Effect Analysis

Table 4 reports the results of the mediation effect test. To examine how AC mediates the effect of DT on EP, this study used a three-step approach, and the findings indicated that AC plays a mediation role in this relationship. First, the regression analysis in Column (1) shows that the coefficient of DT (0.031) is significantly positive at the 1% level. Column (2) shows that the coefficient of DT with respect to AC is 0.004, presenting a positive effect that is significant at the 10% level. Finally, in Column (3), after accounting for the effect of AC, the coefficient of DT on EP remains statistically significant at the 1% level (0.031), while the coefficient of AC on EP is 0.044, which is significantly positive at the 10% level. These results validate Hypothesis 2: AC mediates the relationship between DT and EP.

Table 4. Mediation Effect: Adaptive Capacity

| | (1) | (2) | (3) |
|----------------|----------|-----------|----------|
| | EP | AC | EP |
| DT | 0.031*** | 0.004* | 0.031*** |
| | (3.667) | (1.744) | (3.645) |
| AC | | | 0.044* |
| | | | (1.649) |
| _cons | 9.411*** | -0.935*** | 9.452*** |
| | (22.089) | (-7.598) | (22.149) |
| Year | Yes | Yes | Yes |
| Id | Yes | Yes | Yes |
| N | 20007 | 20007 | 20007 |
| R ² | 0.260 | 0.127 | 0.260 |
| F | 313.063 | 129.948 | 297.576 |

4.5. Moderating Effect Analysis

Table 5 presents the results of the moderating effect test. The regression results in Table 5 indicate that the coefficient for DT is 0.03, which is significant at the 1% level. The interaction term between DT and Entre (DTentre) exhibits a coefficient of 0.124, passing the significance test at the 5% level. This indicates that Entre exerts a significant moderating influence on how DT affects EP. This outcome validates Hypothesis 3, which proposes that Entre plays an important moderating role in the relationship between DT and the improvement of EP.

Table 5. Moderating Effects: Entrepreneurship

| | |
|----------------|----------|
| | EP |
| DT | 0.030*** |
| | (3.590) |
| Entre | 1.506 |
| | (1.260) |
| DTentre | 0.124** |
| | (2.157) |
| _cons | 9.500*** |
| | (22.163) |
| Year | Yes |
| Id | Yes |
| N | 20007 |
| R ² | 0.260 |
| F | 283.639 |

4.6. Heterogeneity Analysis

4.6.1. Analysis of Regional Heterogeneity

In this study, sample enterprises are divided into eastern region (East = 1) and non-eastern regions (East = 0), and separate regression analyses are conducted for the two groups; the results are reported in Table 6. For enterprises in the eastern region, DT significantly boosts EP: as shown in Column (1), the coefficient of DT for eastern enterprises is 0.038, which is statistically significant at the 1% level. By contrast, DT does not exhibit such a significant effect on enterprises in central and western regions. Column (2) shows that the coefficient of DT for non-eastern enterprises is merely 0.006 and fails to reach statistical significance.

Regional heterogeneity likely stems from the Eastern Region's multifaceted advantages. It possesses abundant human capital, advanced technology, ample funding, and a well-developed institutional environment—conditions that provide a solid foundation for corporate DT. Furthermore, the Eastern Region began its DT earlier, leveraging favorable geographical advantages and robust technological innovation capabilities to further drive EP improvements [21].

Table 6. Analysis of Regional Heterogeneity

| | (1) East=1 | (2) East=0 |
|----------------|------------|------------|
| | EP | EP |
| DT | 0.038*** | 0.006 |
| | (3.810) | (0.357) |
| _cons | 9.806*** | 9.255*** |
| | (19.091) | (11.893) |
| Year | Yes | Yes |
| Id | Yes | Yes |
| N | 14746 | 5261 |
| R ² | 0.277 | 0.224 |
| F | 249.262 | 68.403 |

4.6.2. Analysis of Factor Intensity Heterogeneity

Based on the regression analysis results (see Table 7), this paper observes a significant difference in the impact of DT on the EP of capital-intensive enterprises (Capital = 1) and non-capital-intensive enterprises (Capital = 0). In Column (1) for capital-intensive firms, the coefficient for DT is 0.002 and statistically insignificant, indicating that DT has a limited effect on enhancing EP for this type of firm. In contrast, Column (2) focuses on non-capital-intensive firms, where the DT coefficient is 0.034 and achieves significance at the 1% level, suggesting that DT has a significant positive impact on EP for these firms.

This may stem from capital-intensive enterprises' heavy reliance on fixed assets, which constrains their flexibility and investment capacity for DT. Conversely, the significant positive effect observed in non-capital-intensive enterprises suggests these firms are more likely to reduce transaction costs and enhance investment returns through DT, thereby boosting EP. Typically more knowledge- and technology-dependent, such enterprises can make more effective use of new technologies in the process of DT to optimize production processes and boost EP [1].

Table 7. Analysis of Factor Intensity Heterogeneity

| | (1) Capital=1 | (2) Capital=0 |
|----------------|---------------|---------------|
| | EP | EP |
| DT | 0.002 | 0.034*** |
| | (0.088) | (3.515) |
| _cons | 7.644*** | 9.756*** |
| | (8.382) | (20.007) |
| Year | Yes | Yes |
| Id | Yes | Yes |
| N | 3511 | 16496 |
| R ² | 0.266 | 0.264 |
| F | 56.191 | 261.988 |

5. Conclusions

5.1. Research Conclusions

From the perspective of dynamic theory, this study constructs a regression model drawing on data from A-share listed companies spanning 2011 to 2020. It explores the relationship between DT and EP, along with the mediation role of AC and the moderating role of Entre. Additionally, grouped tests are carried out based on regional location and factor intensity. The study has three key conclusions: First, benchmark regression results show that DT effectively boosts EP—a conclusion that remains robust after undergoing stability and endogeneity tests. Second, mediation analysis reveals that DT significantly enhances EP by virtue of AC, while Entre plays a positive moderating role in this relationship. Third, the positive impact of DT on EP is more notable for enterprises located in eastern China and non-capital-intensive enterprises.

5.2. Policy Implications

First, vigorously advance DT. Governments can incentivise enterprises to increase investment in digital technologies through measures such as tax incentives. Enterprises should proactively formulate digital strategies and introduce advanced technologies including artificial intelligence. Second, focus on enhancing AC and Entre. Enterprises should efficiently utilise resources and information generated by DT, establishing flexible mechanisms to respond swiftly to market and technological shifts. Governments may foster Entre by recognising outstanding entrepreneurs and

providing start-up advisory services. Third, implement differentiated strategies. Enterprises in eastern regions should leverage regional synergies to spearhead digital innovation; those in central and western regions must strengthen digital infrastructure development to narrow the gap with the east. Capital-intensive enterprises are advised to optimise asset allocation and enhance digital talent cultivation; non-capital-intensive enterprises should improve technological integration capabilities to further consolidate their DT advantages.

5.3. Research Gaps and Outlook

This research has room for improvement in several aspects. First, adopting a multi-indicator framework to measure EP in a comprehensive manner could help improve the accuracy of the research findings. Second, this study did not conduct in-depth analysis of specific industries like manufacturing, or the service sector. Future research can further explore industry-specific differences to investigate the heterogeneous effects of DT across various sectors.

Reference

- [1] Zheng Yu, Shi Dan. Empirical Study on the Enterprise Performance Mechanism of Digital Transformation: Testing Mediation Effects Based on Transaction Costs and Investment Returns [J]. *Journal of Central University of Finance and Economics*, 2025, (04): 144-160.
- [2] Wang Kaiyang, Sun Zhuo, Chen Pengcheng. The Impact of Digital Transformation on Corporate Financial Performance: The Mediation and Moderating Roles of Dynamic Capabilities [J]. *Management Review*, 2024, 36 (12): 249-262.
- [3] Yamin Abu Alrub, Sandra M. Sánchez-Cañizares. Dynamic Capabilities and Digital Transformation: Toward Strategic Planning in the Digital Age—Evidence from Palestine [J]. *Administrative Sciences*, 2025, 15 (1): 21-21.
- [4] Wang Xiaoping, Wang Yifan, Chen Donghua. How Does Digitalization Influence Innovation Performance of Manufacturing Enterprises in Emerging Countries? The Perspective of Dual Innovation Synergy [J]. *Polish Journal of Environmental Studies*, 2024, 33: 123-135.
- [5] Song Jing, Chen Jin. The Influence of Entrepreneurial Social Networks on Corporate Digitalization: The Moderating Role of Strategic Flexibility [J]. *Research in Science of Science*, 2022, 40 (01): 103-112.
- [6] Cheng Xuanmei, Yang Yang. Unraveling Business Model Innovation in Digital Reconstruction: The Power of Strategic Flexibility [J]. *Research on Science and Technology Management*, 2022, 42 (16): 111-118.
- [7] Yuan Yue, Wu Hui, Shen Yang. Achieve sustainable operation of agricultural enterprises: improving agribusiness performance through digital transformation [J]. *Frontiers in Sustainable Food Systems*, 2025.
- [8] Li Qi, Liu Ligang, Shao Jianbing. Digital Transformation, Supply Chain Integration, and Enterprise Performance: The Moderating Role of Entrepreneurship [J]. *Economic Management*, 2021, 43 (10): 5-23.
- [9] Yang Lin, He Xin, Gu Hongfang. Executive Team Experience, Dynamic Capabilities, and Corporate Strategic Breakthroughs: The Moderating Effect of Managerial Autonomy [J]. *Management World*, 2020, 36 (06): 168-188+201+252.
- [10] Radhakrishnan Balakrishnan, Satyasiba Das. How do firms reorganize to implement digital transformation? [J]. *Strategic Change*, 2020, 29 (5): 531-541.
- [11] Li Feng. The digital transformation of business models in the creative industries: A holistic framework and emerging trends [J]. *Technovation*, 2020, 92-93: 102012.
- [12] Ludovico Bullini Orlandi, Alessandro Zardini, Cecilia Rossignoli. Highway to hell: Cultural propensity and digital infrastructure gap as recipe to entrepreneurial death [J]. *Journal of Business Research*, 2021, 123: 188-195.
- [13] Mauro Paoloni, Daniela Coluccia, Stefano Fontana, et al. Knowledge management, intellectual capital and entrepreneurship: a structured literature review [J]. *Journal of Knowledge Management*, 2020, 24 (8): 1797-1818.

- [14] KaiChao Shao, Xiaohua Wang. Do government subsidies promote enterprise innovation?—Evidence from Chinese listed companies [J]. *Journal of Innovation & Knowledge*, 2023, 8 (4).
- [15] Wang Haijun, Yao Guorong. A Study on the Impact of Digital Transformation on Enterprise Performance: The Mediation Effect of Entrepreneurship [J]. *Enterprise Economics*, 2025, 44 (03): 150-160.
- [16] Zhang Yanming, Yang Lanqing, Fu Huixia, et al. Digital Transformation, Carbon Disclosure, and Corporate Value: Empirical Evidence from Listed Companies in the Energy Industry [J]. *Accounting Journal*, 2025, (15): 20-28.
- [17] Wu Fei, Hu Huizhi, Lin Huiyan, et al. Corporate Digital Transformation and Capital Market Performance: Empirical Evidence from Stock Liquidity [J]. *Management World*, 2021, 37 (07): 130-144+10.
- [18] Wen Zhonglin, Ye Baojuan. Mediation Effect Analysis: Methodology and Model Development [J]. *Advances in Psychological Science*, 2014, 22 (05): 731-745.
- [19] Qi Wenhao, Song Changxing, Cai Hongbo. Construction of Free Trade Pilot Zones and Regional Economic Security Levels [J]. *China Industrial Economics*, 2024, (03): 119-137.
- [20] Wang Yuncheng, Yang Ruoyi, He Kang, et al. Can Digital Transformation Improve Corporate ESG Performance?—A Study Based on Legitimacy Theory and Information Asymmetry Theory [J]. *Securities Market Herald*, 2023, (07): 14-25.
- [21] Yang Haochang, Lai Meng, Li Lianshui. Research on the Impact of Digital Transformation on the Integration of Industrial Chains and Innovation Chains [J]. *China Science and Technology Forum*, 2025, (03): 65-76.