

# The Impact of Digital Transformation on Absorptive Capacity: Moderating Effect Based on Executive Incentives

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**Abstract:** This paper selects the relevant data of A-share listed companies of manufacturing enterprises from 2014 to 2021 to analyze the impact of digital transformation on the absorptive capacity of manufacturing enterprises and the regulatory effect of executive incentives on digital transformation and absorptive capacity of enterprises. The results show that: (1) Digital transformation has a significant positive correlation to the absorptive capacity of manufacturing enterprises; (2) Executive compensation incentives can positively regulate the relationship between digital transformation and absorptive capacity of manufacturing enterprises; (3) The negative direction of executive equity incentives regulates the relationship between digital transformation and the absorptive capacity of manufacturing enterprises.

**Key words:** Digital Transformation, Absorptive Capacity, Executive Compensation Incentive, Executive Equity Incentive

## 1 Introduction

With the rapid development of science and technology and the wide application of digital technology, digital transformation has become the development trend of many industries and the core competitiveness of enterprises. In the manufacturing sector, digital transformation can not only promote efficient production and reduce costs, but also improve product quality, accelerate product innovation and improve customer experience. However, while digital transformation brings many opportunities, it also brings a host of challenges. Manufacturing enterprises need to have a certain absorption capacity in the digital transformation to be able to adapt to the changing digital technology and market demand. The research on digital transformation and absorptive capacity of manufacturing enterprises can provide theoretical and practical guidance for manufacturing enterprises in the process of digital transformation, and promote the sustainable development of enterprises and the improvement of competitive advantages.

## **2 Theoretical analysis and hypothesis**

### **2.1 Digital transformation and absorptive capacity of manufacturing enterprises**

The essence of digital transformation is the process of enterprise change, and the key to the successful transformation of enterprises is to have the corresponding continuous adaptation mechanism. Absorptive capacity refers to the ability of enterprises to identify, absorb, transform and apply valuable external knowledge, which plays a key role in improving the digital maturity of enterprise design mechanism.

The existing literature emphasizes the importance of absorptive capacity in the digital transformation process. Liu et al.(2013) found that digital transformation can enable enterprises to quickly obtain information from various stakeholders and effectively expand the depth and breadth of enterprise information flow <sup>[1]</sup>. Organizations with strong absorption capacity can make use of massive information to continuously innovate, balance internal and external cooperation, effectively respond to enterprise changes to maintain the normal operation of enterprises, and complete the strategic adjustment ability to adapt to digital technology and organizational change .

Paunov & Rollo (2016) indicates that enterprises can use digital information technology to deeply tap customer consumption demand, thereby improving product competitiveness and service quality <sup>[2]</sup>. The data analysis stage is one of the important foundational stages of digital transformation, where companies often recruit employees with complex knowledge skills and learning ability to quickly process advanced knowledge from the platform, and in the process, the absorption capacity of the enterprise is strengthened. The application of big data, Internet of Things and other technologies can break the boundary between the manufacturing industry and its suppliers, improve the ability of enterprises to identify and acquire external information and knowledge, and realize the absorption of external diversified knowledge and the penetration of internal diversified knowledge, thus promoting the improvement of the absorption capacity of manufacturing enterprises <sup>[3]</sup>. By improving the transparency of enterprise information, digital transformation reduces the information asymmetry among different stakeholders and provides conditions for the absorption and transformation of various information. In the context of digital economy, digital transformation can realize the digital transformation of the whole process by promoting dynamic capabilities and using digital technology to analyze the organization's business <sup>[4]</sup>.

Based on this, hypothesis 1 is proposed:

H1: Digital transformation can positively promote the absorption capacity of manufacturing enterprises.

### **2.2 The moderating role of executive incentives in the relationship between digital transformation and absorptive capacity**

As the main body of business decision-making, the behavior of senior executives will have a key impact on the innovation activities of enterprises. Existing literature has discussed the characteristics of senior management team heterogeneity <sup>[5]</sup>, senior management experience <sup>[6]</sup>, senior management gender<sup>[7]</sup> and other characteristics. Enterprise green technology innovation is a long-term and high-risk investment activity, and short-sighted is the inherent characteristic

of managers. The principal-agent theory points out that encouraging senior executives can effectively avoid their short-sighted behaviors, and reasonable incentive levels can unite the goals of owners and managers <sup>[8]</sup>.

According to the theory of optimal compensation contract, when the compensation level of managers is high, the self-interested behavior of managers will be reduced, and senior executives will be more willing to proceed from the interests of shareholders and think more from the perspective of long-term development of enterprises when making business decisions. Equity incentive is a relatively long-term oriented incentive, which can make the interests of executives more compatible with the interests of the enterprise. Management shareholding means that the management and shareholders share the interests, and linking the personal wealth expectation of executives with the stock price of the enterprise can strengthen the long-term strategic orientation of the enterprise <sup>[9]</sup>. Pan Yuxiang et al. (2023) conducted research from different life cycle stages and found that compensation incentives would encourage executives to continuously use the company's own funds for innovation and research and development to gain more market share; As a long-term incentive method, equity incentive can form a convergence effect between executives and shareholders, so as to invest more actively in promising innovative projects <sup>[10]</sup>. In the context of digital economy, as manufacturing enterprises are the main source of environmental pollution, their digital transformation has received great attention, and enterprises must pay attention to their ability to digest and absorb massive information while carrying out digital transformation. Therefore, incentives for executives in the process of digital transformation can encourage executives to invest more research and development funds to improve the absorption capacity of enterprises and carry out innovative activities.

In addition, the green development of manufacturing enterprises is highly innovative, so human capital is of great significance to enterprises. As the owners of human capital are risk bearers and wealth creators, their property rights can be protected only when the owners of human capital can enjoy the residual profits of enterprises. Executive compensation incentive and equity incentive can guarantee the executive's property rights as the owner of human capital. According to the hypothesis of rational economic man, when the income increases, the motivation of individuals to invest will be enhanced, and the investment of enterprises in R & D will increase, and the absorption capacity will be greatly improved.

Based on this, hypothesis 2 and hypothesis 3 are proposed:

H2: Executive compensation incentives can positively regulate the relationship between digital transformation and absorptive capacity of manufacturing enterprises.

H3: Executive equity incentive can positively regulate the relationship between digital transformation and absorptive capacity of manufacturing enterprises.

### **3 Empirical analysis**

#### **3.1 Main effect regression**

Table 1 shows the regression results of the main effect, and column (1) shows the regression results of each control variable on the absorption capacity of manufacturing enterprises. The

results show that the selection of control variables is effective. In column (2), the explanatory variable of digital transformation is added on the basis of column (1). According to column (2), the regression coefficient of digital transformation is 0.543, which is significant at 1% level, indicating that digital transformation is positively correlated with the absorptive capacity of enterprises. That is, the digital application of manufacturing enterprises can significantly improve the absorption and utilization of various knowledge by enterprises, so as to enhance the R&D and innovation ability of enterprises.

**Tab.1** Main effect regression results

	(1)	(2)
	rd	rd
dt		0.543*** (0.091)
size	1.576*** (0.211)	1.473*** (0.212)
age	1.026*** (0.033)	0.972*** (0.034)
growth	-0.505*** (0.155)	-0.511*** (0.155)
lev	-5.975*** (0.728)	-5.955*** (0.727)
cash	-1.139 (1.115)	-1.054 (1.113)
_cons	-41.274*** (4.229)	-38.601*** (4.244)
N	9846.000	9846.000
r2_a	0.035	0.035
Id/year	Yes	Yes

### 3.2 Moderating effect regression

Table 2 reports the regression results of executive incentive as a moderating effect. Columns (1) and (2) show that the interaction coefficient between executive compensation incentive and digital transformation is significantly positive and significant at the 1% level, assuming H2 is valid. It shows that the absorptive capacity of manufacturing enterprises is not only related to the degree of digital transformation, but also related to executive compensation incentive, and executive compensation incentive can positively regulate the relationship between digital transformation and absorptive capacity of manufacturing enterprises. Column (3)- (4) reports the impact of executive equity incentive on digital transformation and absorptive capacity of manufacturing enterprises. From column (4), it can be seen that the interaction coefficient between executive equity incentive and digital transformation is significantly negative and significant at 1% level, and hypothesis H3 is not valid. The possible reason lies in the entrenchment effect of executive equity incentives. The higher the executive's voting rights and bargaining power, the stronger the opportunist motive to use power for personal gain <sup>[11]</sup>,

and the more likely it is to engage in rent-seeking behavior, which will also affect the R&D investment behavior of the enterprise, which is not conducive to the improvement of the absorption capacity of the enterprise.

**Tab.2** Moderating effect regression results

	(1)	(2)	(3)	(4)
	rd	rd	rd	rd
digital	0.245*** (0.073)	0.220*** (0.073)	0.244*** (0.073)	0.233*** (0.073)
in1	-0.182 (0.146)	-0.159 (0.146)		
in2			0.573 (0.515)	0.330 (0.522)
TJ1		0.528*** (0.075)		
TJ2				-0.923*** (0.331)
controls	yes	yes	yes	yes
N	9846.000	9846.000	9846.000	9846.000
r2_a	-0.125	0.429	-0.123	-0.060
Id/year	Yes	Yes	Yes	Yes

## 4 Conclusions

In the context of the transformation and upgrading of the manufacturing industry, it is of great significance to study the impact of enterprise digitalization on the absorbability of manufacturing enterprises. This study examines the impact of digital transformation on the absorbability of manufacturing enterprises, and introduces the variable of executive incentive to analyze the mechanism. The findings are as follows: (1) Digital transformation positively promotes the absorptive capacity of manufacturing enterprises. (2) Executive compensation incentives positively regulate the relationship between digital transformation and absorptive capacity of manufacturing enterprises. (3) The negative direction of executive equity incentives regulates the relationship between digital transformation and the absorptive capacity of manufacturing enterprises. In view of the large amount of unbalanced information that is difficult to identify in the market, on the one hand, digital transformation can promote the interactive communication of internal and external information and expand the existing boundaries of enterprises. On the other hand, appropriate compensation incentives for senior executives can avoid the self-serving tendency and short-termism of senior executives, encourage them to take the initiative to grasp the market development trend, timely capture development opportunities, stimulate the innovation potential of enterprises, and improve the

innovation performance of enterprises. The research conclusion is of great significance for promoting the internal incentive system and digital reform of manufacturing enterprises.

## References

- [1] Liu H, Ke W, Wei K, et al. The impact of IT capabilities on firm performance: The mediating roles of absorptive capacity and supply chain agility[J]. *Decision support systems*, 2013, 54(3): 1452-1462.
- [2] Paunov C, Rollo V. Has the internet fostered inclusive innovation in the developing world?[J]. *World Development*, 2016, 78: 587-609.
- [3] Zhang H, Liu D. Research on the impact of digital development on service innovation of Advanced Manufacturing Enterprises: Based on the perspective of enterprise dynamic capability [J]. *China Soft Science*, 2023(03):150-161.
- [4] Zhang W, Liu Y. Research on the mechanism of digital transformation on the innovation performance of multinational enterprises [J]. *Macroeconomic Research*, 2023(06):86-100.
- [5] Peng D, Wu J, Lu W, et al. Digital economy and green innovation in high-tech enterprises: the moderating effect of executive team heterogeneity [J]. *Finance and Economics*, 2023(04):53-64.
- [6] Zhang Z, Yao Z, Lu Q, et al. Can senior executives' overseas experience promote green innovation? [J/OL]. *Foreign economic and management*: 1-15 [2023-07-24]. DOI: 10.16538 / j.carol carroll nki fem. 20221219.401.
- [7] Wang W, Shen Y, Wang X, et al. Female executive power and corporate green innovation [J]. *East China Economic Management*, 2022, 36(12):54-64.
- [8] Jensen M C, Meckling W H. Theory of the firm: Managerial behavior, agency costs and ownership structure[J]. *Journal of financial economics*, 1976, 3(4): 305-360.
- [9] Li R. Research on the impact of management incentives on Enterprise digital transformation [J]. *Technical Economics and Management Research*, 2023(05):47-52.
- [10] Pan Y, Zhu Z, Yang P, et al. Strategic radicalism and firm innovation: a re-examination based on life cycle Theory [J]. *Finance and Accounting Monthly*, 2023, 44(14):25-31.
- [11] Zhao S, Jiang X, Ying Q, et al. Can equity incentive restrain Executive's tendency of quick success and quick profit? Based on the perspective of enterprise innovation [J]. *Nankai Management Review*, 2019, 23(06):76-87.