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*RESEARCH ARTICLE*

# IMPACT OF INNOVATION INVESTMENT ON THE VALUE OF DIGITAL CREATIVE ENTERPRISES: THE MODERATING ROLE OF EXECUTIVE COGNITIVE ABILITY

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**ABSTRACT**

Innovation investment is a crucial means for enterprises to maintain their competitive advantage and achieve transformation and upgrading. This paper examined the impact of innovation investment on the value of Chinese digital creative enterprises based on a sample of listed enterprises in this industry from 2015 to 2020, while considering the moderating role of executive cognitive ability. The findings reveal that innovation investment in Chinese digital creative enterprises has been increasing steadily in recent years and is positively associated with enterprise value. However, an inverted U-shaped relationship exists between innovation investment and enterprise value, as maintaining a moderate level of innovation investment is essential for the healthy development of digital creative enterprises. Moreover, executive cognitive ability can enhance the driving effect of innovation investment on enterprise value. After considering the lag effect of innovation investment, its impact on enterprise value becomes even more apparent.

**KEYWORDS**

Innovation investment, digital creative enterprises, enterprise value, executive cognitive ability

## 1. INTRODUCTION

The Chinese economy is currently undergoing a transition from high-speed development to high-quality development, and innovation plays a crucial role as the driving factor behind this transformation of economic structure. Proactive and autonomous innovation within the enterprise is crucial for realizing China's innovation-driven development strategy. Enterprise innovation can not only improve the technical efficiency of its industry, but also maintain its core competitive advantage in the intense competitive environments (Bloom and Reenen, 2002). For digital creative enterprises, innovation holds a unique significance. Firstly, the creative economy, as a new paradigm of economic development, is becoming an important field for promoting economic growth. Secondly, creativity and innovation are the intrinsic driving forces for digital creative enterprises to create value. Finally, the combination of digital technology as an external driving force for enterprise development and innovation as an internal driving force has the potential to achieve greater economic effects.

However, effective innovation is not an easy task for digital creative enterprises, as innovation often comes with higher risks (Scherer et al., 2000). The pursuit of high-quality innovation requires not only significant financial investment but also research and development capabilities and forward-thinking decision-making. Existing research has shown that as decision-makers in corporate decision-making, the characteristics of management have a significant impact on the development of enterprises (Papadakis and Bourantas, 1998; Graham et al.,2013). Their choices during the innovation process directly determine whether an enterprise can avoid ineffective investments and achieve high-quality innovative outcomes. Differences in managerial cognition can result in significant differences in innovation behavior for enterprises. Ultimately, the goal of enterprise innovation is to attain a competitive advantage and increase enterprise value. Against this backdrop, Chinese digital creative enterprises are increasing their innovation investment and actively engaging in innovative activities with the aim of ultimately boosting enterprise value. Thus, investigating how innovation investment affects enterprise value for digital creative enterprises and whether executive cognitive ability might moderate this effect warrants investigation.

Based on a sample of digital creative enterprises listed on the Chinese A-share market from 2015 to 2020, this study investigates the relationship between innovation investment and enterprise value in the context of economic transformation. Results show that there exists a non-linear inverted U-shaped relationship between innovation investment and enterprise value. For micro-enterprises, constrained by specific resource endowments, maintaining a moderate level of investment can help increase enterprise value. Executive cognitive ability can enhance the impact of innovation investment on enterprise value. This study provides theoretical support for Chinese digital creative enterprises to enhance enterprise value by constructing core competencies through innovation, and offers insights for the high-quality development transformation of China's creative industry.

## 2. THEORETICAL ANALYSIS AND RESEARCH HYPOTHESES

### 2.1 The Impact of Innovation Investment on Enterprise Value

Since Joseph Schumpeter introduced the theory of innovation, numerous studies have affirmed innovation as the driving force behind enterprise and economic growth (Li and Tang, 2016; Prajogo, 2016; Yin et al., 2018). Innovation investment helps enterprises rationally allocate and utilize various resources, expand the scale of operations, and thus increase enterprise value (Kurt, 2019). Research by Lu Guoqing demonstrates that innovation can enhance resource utilization efficiency and optimize enterprise operations, improve product quality, and facilitate diversification (Lu, 2011). A recent study by Dalege et al. also suggests that innovation increases enterprise diversity and enhances its ability to respond to risks (Dalege et al., 2021). Jin and Yang found that improving

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innovation capabilities can increase sales revenue and help open up new markets for businesses, as evidenced by their analysis of the relationship between innovation capability and export performance in Chinese listed enterprises (Jin and Yang, 2018). These studies reveal that although different innovation pathways can lead to varying impacts on enterprise value across enterprises, increasing innovation investment can promote enterprise development. Accordingly, ramping up Rand D investment can significantly boost performance and thereby increase enterprise value (Liu, 2016; Pei and Li, 2023).

However, when examining the innovation practices of Chinese creative enterprises, it becomes apparent that innovation investment does not necessarily lead to high returns. This is due to the impact of enterprise innovation capabilities and innovation costs on the economic benefits of innovation investment. On the one hand, innovation investment imposes higher demands on enterprise innovation capabilities. As innovation projects become larger in scale, they require personnel with higher creativity, broader knowledge fields, more extensive practical experience, and stronger teamwork skills. As innovation investment increases, organizations may find it difficult to obtain human resources to continue effective innovation, leading to a short-term decrease in the efficiency of innovation investments and having an adverse effect on enterprise value. On the other hand, innovation investment requires sustained and sufficient financial support, and an increase in innovation investment will undoubtedly squeeze the capital needs of other production and management projects, possibly altering the enterprise's investment structure and lowering its capital efficiency, thus affecting enterprise value. Therefore, the impact of innovation investment on enterprise value may be non-linear. When the scale of innovation investment matches the corporate resources, the acquisition of funds and personnel is relatively easy, and innovation investment is more likely to increase enterprise value. When an enterprise's innovation investment surpasses optimal levels, as innovation investment scale expands, financial pressure increases, innovation output quality decreases, which could lead to a decrease in enterprise value. Thus, the following hypothesis was made:

H1: There exists an inverted U-shaped non-linear relationship between innovation investment and value of digital creative enterprises.

### 2.2 The Moderating Effect of Executive Cognitive Ability

The executive cognitive ability refers to the ability of executives to perceive, analyze and solve problems in the internal and external of the enterprise using their knowledge, skills and experience.

According to signal transmission theory, executives' personal experiences, educational backgrounds, and social networks lay the foundation for their cognitive ability (Chen and Tang, 2012). Executives often affect enterprise performance and enterprise value through their involvement in major enterprise decisions. Their understanding and judgment about enterprise innovation ultimately reflect in enterprise value. On the one hand, executives with higher cognitive abilities have a better understanding of internal information and external environment and can provide more beneficial opinions for innovation project selection. They can also better control the direction of enterprise innovation to align with the enterprise's development strategy. On the other hand, executives with higher cognitive abilities have stronger information processing abilities and more acute risk awareness, making them more cautious when conducting innovative investment. This can reduce the inefficient investment in innovation by enterprises and prevent any haphazard increase in innovation investment. Therefore, executive cognitive abilities have a positive impact on enterprise performance and ultimately enhance enterprise value (Shi et al., 2017; Sun et al., 2022). Thus, the following hypothesis was made:

H2: Executive cognitive abilities have moderating effects on the relationship between innovation investment and value of digital creative enterprises.

## 3. Research Design

### 3.1 Sample Selection and Data Sources

This study selected digital creative enterprises listed on the A-share market in China from 2015 to 2020 as a sample. The classification criteria for the digital creative industry in the *Classification of Strategic Emerging Industries (2018)* published by the National Bureau of Statistics of China were used to identify the initial sample by comparing the main business. The following screening was then performed: (1) ST and *ST enterprises were excluded; (2) Enterprises that experienced significant changes in business during the sample period were excluded; (3) Samples with abnormal or missing indicators were excluded. In the end, 1,037 observation samples were obtained. As innovation investment has a lag effect, the data period for innovation investment is from 2013 to 2020.

### 3.2 Model Construction and Variable Definition

Based on the research hypotheses proposed earlier, the following models were constructed to examine the impact of innovation investment on the value of digital creative enterprises and the moderating role of executive cognitive ability.

$$EVA_{it} = \alpha_0 + \alpha_1 INNO_{it} + \alpha_2 INNO_{it}^2 + \alpha_3 LEV_{it} + \alpha_4 Q_{it} + \alpha_5 SIZE_{it} + \alpha_6 HHI_{it} + \alpha_7 CASH_{it} + \varepsilon_{it} \quad (1)$$

$$EVA_{it} = \alpha_0 + \alpha_1 INNO_{it} + \alpha_2 INNO_{it}^2 + \alpha_3 SUM_{it} + \alpha_4 SUM_{it} * INNO_{it} + \alpha_5 LEV_{it} + \alpha_6 Q_{it} + \alpha_7 SIZE_{it} + \alpha_8 HHI_{it} + \alpha_9 CASH_{it} + \varepsilon_{it} \quad (2)$$

Considering that the impact of innovation investment on enterprise value has a lag effect, this paper constructed a lag test model by lagging innovation investment by one and two periods, respectively.

$$EVA_{it} = \beta_0 + \beta_1 INNO_{it-1} + + \beta_2 INNO_{it-1}^2 + \beta_3 LEV_{it} + \beta_4 Q_{it} + \beta_5 SIZE_{it} + \beta_6 HHI_{it} + \beta_7 CASH_{it} + \mu_{it} \quad (3)$$

$$EVA_{it} = \beta_0 + \beta_1 INNO_{it-1} + \beta_2 INNO_{it-1}^2 + \beta_3 SUM_{it} + \beta_4 SUM_{it} * INNO_{it-1} + \beta_5 LEV_{it} + \beta_6 Q_{it} + \beta_7 SIZE_{it} + \beta_8 HHI_{it} + \beta_9 CASH_{it} + \mu_{it-1} \quad (4)$$

$$EVA_{it} = \lambda_0 + \lambda_1 INNO_{it-2} + \lambda_2 INNO_{it-2}^2 + \lambda_3 LEV_{it} + \lambda_4 Q_{it} + \lambda_5 SIZE_{it} + \lambda_6 HHI_{it} + \lambda_7 CASH_{it} + \omega_{it-2} \quad (5)$$

$$EVA_{it} = \gamma_0 + \gamma_1 INNO_{it-2} + \gamma_2 INNO_{it-2}^2 + \gamma_3 SUM_{it} + \gamma_4 SUM_{it} * INNO_{it-2} + \gamma_5 LEV_{it} + \gamma_6 Q_{it} + \gamma_7 SIZE_{it} + \gamma_8 HHI_{it} + \gamma_9 CASH_{it} + \omega_{it} \quad (6)$$

## 4. Empirical Results and Analysis

### 4.1 Descriptive Statistics

Table 1 reports the descriptive statistics of the main variables in this study. The mean value of the value of digital creative enterprises is 22.894, with a standard deviation of 0.949, indicating that there are differences in the value of Chinese digital creative enterprises, but the differences are not significant. This may be due to the fact that digital creative enterprises are a new industry with a relatively short development history and generally small in size. The mean values of innovation investment and its lagged periods are 0.031, 0.029, and 0.028, respectively, indicating that the proportion of innovation investment in total assets of Chinese digital creative enterprises is around 3% and showing an upward trend year by year. This suggests that digital creative enterprises attach great importance to the role of innovation and actively engage in innovative activities, which is in line with China's current implementation of the innovation-driven development strategy.

**Table 1:** Descriptive Statistics

| Variable | N | Mean | SD | Min | p50 | Max |
|---|---|---|---|---|---|---|
| EVA | 1037 | 22.894 | 0.949 | 20.534 | 22.797 | 26.749 |
| $INNO_t$ | 1037 | 0.031 | 0.032 | 0 | 0.023 | 0.239 |
| $INNO_{t-1}$ | 1037 | 0.029 | 0.032 | 0 | 0.021 | 0.272 |
| $INNO_{t-2}$ | 1037 | 0.028 | 0.032 | 0 | 0.021 | 0.273 |
| SUM | 1037 | 3.582 | 0.861 | 1.54 | 3.527 | 5.804 |
| LEV | 1037 | 0.395 | 0.201 | 0.065 | 0.385 | 0.962 |
| Q | 1037 | 2.404 | 2.427 | 0.187 | 1.699 | 24.941 |
| SIZE | 1037 | 22.232 | 1.072 | 18.83 | 22.139 | 27.091 |
| HHI | 1037 | 0.288 | 0.139 | 0.053 | 0.261 | 0.770 |
| CASH | 1037 | 0.042 | 0.073 | -0.651 | 0.042 | 0.454 |

| **Table 2:** The Test Results of Innovation Investment and Enterprises Value | | | | | | |
|---|---|---|---|---|---|---|
| | (1) | | (2) | | (3) | |
| EVA | Coefficient | t-value | Coefficient | t-value | Coefficient | t-value |
| $INNO_t$ | 1.796*** | 4.250 | | | | |
| $INNO_{t-1}$ | | | 1.926*** | 4.800 | | |
| $INNO_{t-2}$ | | | | | 1.796*** | 3.560 |
| LEV | -0.259*** | -4.530 | -0.255*** | -4.520 | -0.254*** | -4.480 |
| Q | 0.216*** | 12.70 | 0.216*** | 12.70 | 0.215*** | 12.61 |
| SIZE | 0.891*** | 63.30 | 0.890*** | 63.23 | 0.890*** | 62.82 |
| HHI | -0.0401 | -0.530 | -0.0373 | -0.500 | -0.0503 | -0.680 |
| CASH | 0.184 | 1.350 | 0.192 | 1.400 | 0.207 | 1.500 |
| cons | 2.622*** | 7.910 | 2.632*** | 7.940 | 2.643*** | 7.880 |

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

### 4.2 Regression Results and Analysis

To examine the potential non-linear relationship between innovation investment and value of digital creative enterprises, this study has been divided into two steps. Table 2 presents the results of the test without the addition of the innovation investment quadratic term. Under the linear assumption, the coefficient of innovation investment is 1.796, and the coefficients of its lagged data are 1.926 and 1.796, both significant at the 1% level. Therefore, it can be inferred that innovation investment has a positive impact on value of digital creative enterprises, which implies that innovation investment can enhance its value.

Subsequently, we have added the innovation investment quadratic term to assess the non-linear hypothesis, as shown in Table 3. The coefficient of innovation investment is 2.934, which is statistically significant at the 1% level, while the coefficient of the innovation investment quadratic term is -8.479, significant at the 10% level. With the inclusion of the quadratic term, the coefficient of innovation investment exhibits growth compared to its linear counterpart, and the non-linear model shows a better goodness of fit. These results suggest that innovation investment has a greater tendency to influence value of digital creative enterprises under non-linear relationships. Furthermore, the negative coefficient of the innovation investment quadratic term in Table 3 reveals an inverted U-shaped relationship between innovation investment and value of digital creative enterprises. The study finds that reasonable and appropriate levels of innovation investment contribute to the enhancement of enterprise value. However, when innovation investment surpasses a certain threshold, it may lead to over-investment or aggressive investment behavior, which could ultimately damage the enterprise's value. Hypothesis 1 has been confirmed, as the analysis using either one or two periods of lagged innovation investment produced consistent results. Additionally, in the lagged model, the innovation investment quadratic term showcases a significantly higher level of significance, indicating that the lag effect of innovation investment on value of digital creative enterprises is apparent.

To verify the moderating effect of executive cognitive ability, an interactive term between executive cognitive ability and innovation investment was introduced in the previous model. The regression results are presented in Table 4. The coefficient of innovation investment still exhibits significant positive results, and the coefficient of the innovation investment quadratic term remains negative but insignificant. The coefficient of the interactive term is positive but not significant. These outcomes suggest that executive cognitive ability does not influence the relationship between current innovation investments and enterprise value, possibly due to the lag effect of innovation investment on enterprise value. Using data lagged by one or two periods of innovation investment, the signs of the coefficients of innovation investment, innovation investment squared, and the interaction term have not changed. However, the coefficients of the innovation investment quadratic term and the interactive term become significant. These results indicate that executive cognitive ability can enhance innovation investment's positive impact on enterprise value once the lag effect of innovation investment is considered.

| **Table 3:** The Test Results of Innovation Investment and Enterprises Value | | | | | | |
|---|---|---|---|---|---|---|
| | **(1)** | | **(2)** | | **(3)** | |
| **EVA** | **Coefficient** | **t-value** | **Coefficient** | **t-value** | **Coefficient** | **t-value** |
| $INNO_t$ | 2.934*** | 3.920 | | | | |
| $INNO_t^2$ | -8.479* | -1.670 | | | | |
| $INNO_{t-1}$ | | | 2.996*** | 4.660 | | |
| $INNO_{t-1}^2$ | | | -7.766** | -2.230 | | |
| $INNO_{t-2}$ | | | | | 3.965*** | 4.670 |
| $INNO_{t-2}^2$ | | | | | -14.65** | -2.130 |
| LEV | -0.256*** | -4.470 | -0.251*** | -4.430 | -0.244*** | -4.260 |
| Q | 0.216*** | 12.67 | 0.215*** | 12.67 | 0.214*** | 12.56 |
| SIZE | 0.891*** | 63.46 | 0.890*** | 63.46 | 0.890*** | 62.77 |
| HHI | -0.0229 | -0.300 | -0.0216 | -0.290 | -0.0213 | -0.290 |
| CASH | 0.188 | 1.370 | 0.200 | 1.450 | 0.234 | 1.690 |
| cons | 2.599*** | 7.890 | 2.607*** | 7.900 | 2.591*** | 7.690 |

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

**Table 4:** The Mediating Effect of Cognitive Ability of Enterprise Executives

| | (1) | | (2) | | (3) | |
|---|---|---|---|---|---|---|
| **EVA** | **Coefficient** | **t-value** | **Coefficient** | **t-value** | **Coefficient** | **t-value** |
| $INNO_t$ | 9.699*** | 5.020 | | | | |
| $INNO_t^2$ | -8.064 | -1.350 | | | | |
| $SUM*INNO_t$ | 1.854 | 1.610 | | | | |
| $INNO_{t-1}$ | | | 8.813*** | 5.050 | | |
| $INNO_{t-1}^2$ | | | -9.956** | -2.040 | | |
| $SUM*INNO_{t-1}^2$ | | | 1.511*** | 3.330 | | |
| $INNO_{t-2}$ | | | | | 9.772*** | 4.830 |
| $INNO_{t-2}^2$ | | | | | -12.96** | -2.230 |
| $SUM*INNO_{t-2}^2$ | | | | | 1.655*** | 3.540 |
| sum | 0.163*** | 8.220 | 0.153*** | 8.270 | 0.152*** | 7.990 |
| LEV | -0.225*** | -4.090 | -0.221*** | -4.060 | -0.212*** | -3.870 |
| Q | 0.202*** | 11.87 | 0.201*** | 11.81 | 0.202*** | 11.89 |
| SIZE | 0.874*** | 60.21 | 0.874*** | 60.26 | 0.874*** | 59.96 |
| HHI | -0.103 | -1.460 | -0.0969 | -1.390 | -0.104 | -1.530 |
| CASH | 0.229 | 1.810 | 0.245 | 1.890 | 0.268 | 2.060 |
| cons | 2.418*** | 7.500 | 2.449*** | 7.570 | 2.455*** | 7.560 |

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

## 5. Research Conclusions

This paper takes China's A-share listed digital creative enterprises as the research object, analyzes the impact of innovation investment on enterprise value, and examines the moderating effect of executive cognitive ability. Against the backdrop of China's transition towards high-quality economic development, digital creative enterprises in China have been actively engaged in innovation activities, and innovation investment has been increasing year by year. The study reveals that there is a compelling non-linear association between innovation investment and enterprise value, characterized by an inverted U-shaped curve. Hence, strategically calibrated innovation investments can positively enhance enterprise value, while overspending on innovation efforts and aggressive innovation behavior may have negative consequences on enterprise value. Additionally, the lag effect of innovation investment is significant, and executive cognitive ability can act as a vital moderator in strengthening the positive influence of innovation investment on enterprise value.

This study yields several crucial implications for digital creative enterprises in China. Specifically, innovation investment contributes to increasing the enterprise value of Chinese digital creative companies, but moderate investment principles should be followed in the process of innovation investment. Enterprises should carefully consider their resource endowments and avoid overinvestment and aggressive investment. Balancing innovation investment is a dynamic process that requires optimizing resource allocation and resource utilization efficiency to expand the optimal scale of innovation investment. Furthermore, attracting top talent to the management team could improve investment decision-making and enhance enterprise value.

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