# Research on the Relationship Between Absorptive Capacity and Innovation Capacity of AI enterprises: the Moderating Effect of R&D Leap and Value Cognition Complexity

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**Abstract:** Artificial intelligence is the product of information technology at an advanced stage. As a key driver of the new round of global technological revolution and industrial transformation, artificial intelligence is building new momentum. For artificial intelligence enterprises, the key to maintain competitiveness in a changing environment lies in the improvement of Innovation capacity. To make effective innovations, they need to enhance their absorptive capability, acquire more knowledge from the outside world and break with tradition. From the perspective of punctuated equilibrium theory and value cognition, this paper, using the data of 84 listed companies of artificial intelligence concept stocks from 2011 to 2021 as a sample, analyses and examines the impact of absorptive capacity on Innovation capacity, and the moderating effect of R&D leap and value cognition complexity on the above relation. The results show that absorptive capacity positively affects Innovation capacity, that R&D leap negatively moderates the relationship between absorptive capacity and Innovation capacity, and that the joint interaction between value cognition complexity and R&D leap positively moderates the relationship between absorptive capacity and Innovation capacity. The findings of this paper provide guidance for enterprises to formulate innovation improvement strategies in a complex and changeable environment.

**Keywords:** Absorptive Capacity, Innovation Capacity, R&D Leap, Value Cognition.

## 1 INTRODUCTION

With the continuous improvement of computer hardware performance and computing technology, artificial intelligence technology and its applications are faced with significant opportunities [12]. As the field of artificial intelligence is experiencing rapid changes in an unpredictable environment, enterprises need to continuously absorb, acquire, and use external knowledge and resources and upgrade their technical foundations to survive and develop in the rat race. Meanwhile, the R&D leap resulting from the alternation and conversion of exploratory innovation and exploitative innovation -based on the punctuated equilibrium theory- in time helps achieve the discontinuous equilibrium of technological innovation and the effective management of R&D resources [10]. The ultimate goal is to maximize innovation output with high-value enterprise capabilities. However, enterprise innovation activities involve many value creation links [17]. Enterprises need to control the R&D leap through the value cognition system

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to effectively allocate resources and to improve the Innovation capacity of enterprises. In the era of digital intelligence, it is of vital importance for artificial intelligence enterprises to choose an appropriate R&D leap based on the value cognition framework to improve the synergy between the absorptive capacity and Innovation capacity. However, there are few research on this subject.

First, the relationship between absorptive capacity and Innovation capacity remains controversial. At present, there are different views in the academic community on the relationship between absorptive capacity and enterprise innovation. Most scholars believe that enterprise innovation requires the improvement of absorptive capacity of external knowledge, which can reduce innovation risks and improve innovation efficiency [1, 7]. However, some enterprises began to consider the negative impact of absorptive capacity in practice [11]. Instead of denying the role and value of absorptive capacity, they focus on the application scenarios of absorptive capacity.

Second, based on the punctuated equilibrium theory, enterprise innovation activities can be divided into two forms: exploratory innovation and exploitative innovation, and the leap in R&D investment is regarded as a sign of the conversion of the two, as well as the positive feedback that enterprises make according to its own demand and the market development. Previous studies mostly focused on the relation-ship between the jump in R&D investment and corporate performance [9], rather than on the relationship between it as a contextual factor and Innovation capacity. Accurately grasping the right R&D opportunity and rationally allocating R&D resources are the keys to continuously strengthen enterprise Innovation capacity. Therefore, it is necessary to take the above into consideration to study the boundary conditions of the relationship between the absorptive capability and Innovation capacity of artificial intelligence enterprises.

To fill the research gap, this paper uses the data of 84 listed companies with artificial intelligence concept stocks from 2011 to 2021 to study the relationship between the absorptive capacity and Innovation capacity of artificial intelligence companies, as well as the moderating effect of R&D leap and value cognition complexity on this relationship from the perspective of punctuated equilibrium theory and value cognition.

## 2 THEORETICAL BASIS AND HYPOTHESIS

### 2.1 Absorptive Capacity and Innovation Capacity

Amid increasing external uncertainties and turbulence, enterprises need to constantly upgrade their technological foundations. Absorptive capacity is essential for enter-prises to acquire and apply external knowledge [15]. The absorptive capacity and Innovation capacity are closely related. The Innovation capacity of an enterprise is built on its own R&D activities [8] and external knowledge [4]. The application of external knowledge helps an enterprise strengthen its Innovation capacity, because they can improve the R&D efficiency [16] and success rate and optimize new products or new procedures. Therefore, the ability to absorb and utilize new external knowledge is crucial for enterprises to strengthen innovation and competitiveness. Enterprises with a high absorptive capacity usually actively identify and take advantage of market opportunities, effectively use external knowledge to stimulate innovations, and convert

it into innovation output, thereby promoting the Innovation capacity [22]. Based on this, the following assumption is made:

H1: Absorptive capacity positively affects the Innovation capacity of enterprises

### 2.2 The Moderating Effect of R&D Leap on the Relationship between Absorptive Capacity and Innovation Capacity

According to the punctuated equilibrium theory, the transition between exploitative innovation and exploratory innovation is regarded as a R&D leap, and such a leap in capability trajectory between exploitation and exploration is risky [2]. When an enterprise has a small R&D leap, they have made little breakthroughs in existing technology paths, which means they applied the external knowledge and resources they had acquired to existing innovation practices, and had more opportunities to improve Innovation capacity. When an enterprise has a large R&D leap, they have made significant breakthroughs in the existing paths, which means they constantly faced organizational inertia and core rigidity in process of innovation [18], experience and historical data didn't work for new external exploration, they failed to reasonably apply external information and internal knowledge to innovation activities. Based on this, the following assumption is made:

H2: The R&D leap negatively adjusts the relationship between absorptive capacity and Innovation capacity, that is, the smaller the R&D leap, the easier to strengthen the positive relationship between absorptive capacity and Innovation capacity.

### 2.3 The Impact of the Joint Interaction of R&D Leap and Value Cognition Complexity on the Relationship between Absorptive Capacity and Innovation Capacity

The complexity of value cognition indicates the number of value-creating links considered by the enterprise in the process of decision-making cognition. The higher the complexity of value cognition, the more external stimulus enterprises need to consider, the more value links the managers need to focus on. In this context, if enterprises make significant R&D leap, they need to spend a lot of time to reallocate internal resources, so they fail to seize opportunities in time. Too many value links and too much resource allocation result in waste of resources, technology, and time, thus reducing the Innovation capacity. On the contrary, when the complexity of value cognition is low, managers need to consider less value links, so that enterprises can concentrate external knowledge and internal resources to seek suitable opportunities and directions. Therefore, small R&D leap can save time, reduce sunk costs and rationally allocate resources to enterprise innovation activities, thereby improving the Innovation capacity. Based on this, the following assumption is made.

H3: The joint interaction between R&D leap and value cognition complexity positively moderates the relationship between absorptive capacity and Innovation capacity. In the case of a small R&D leap and a low value cognition complexity, this relationship is positive.

The theoretical model of this paper is as follows:

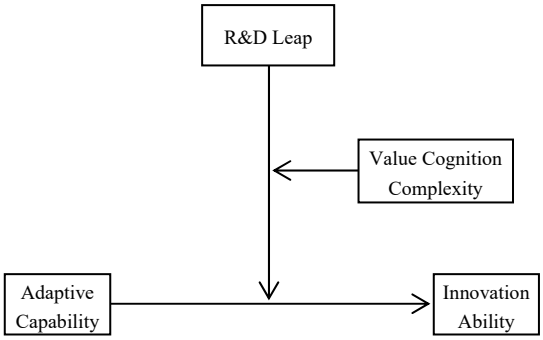


**Figure 1:** Theoretical model

# 3 METHODS AND MATERIALS

## 3.1 Samples and Data Sources

This paper uses the listed companies of the artificial intelligence concept stocks of Straight Flush from 2011 to 2021 as a sample. For more accurate measurement, we preliminarily excluded the data of companies marked with ST, ST*, PT and other signs of poor performance and of companies with missing or incomplete data. Finally, we obtained a sample of 84 companies and 756 specific observations.

This article uses stata 17.0 to process the data. In addition, 2% and 98% winsorize all continuous variables of the sample data to avoid the impact of outliers on the robustness of the results.

## 3.2 Variable Measurement

### 3.2.1 Dependent Variable: Innovation Capacity (IC)

Considering the innovation behavior of enterprises, patents serve as an important indicator of innovation quality. Innovation is to facilitate business operations of enterprises. In practice, the wider the application of a patent, the greater its value to the enterprise, and the more the enterprise is willing to pay for the patent. Therefore, patents are regarded as an indicator of enterprise quality. This paper draws on the research of Yang D et al. (2019) to measure the Innovation capacity of enterprises by the number of invention patent applications.

### 3.2.2 Independent Variable: Absorptive Capacity (AC)

The absorptive capacity of an enterprise is closely related to its R&D investment. Cohen and Levinthal (1990) proposed that the absorptive capacity of an enterprise can be measured by its own R&D investment, which revealed that Chinese enterprises have a relatively high conversion efficiency from R&D investment to innovation patents. Based on the research of Wu et al. (2016), this paper represents the absorptive capacity of enterprises by the intensity of R&D investment, which is expressed as the proportion of R&D investment in operating income.

### 3.2.3 Moderating Variable: R&D Leap (RDL)

This paper makes reference with the research of Mudambi and Swift (2014) and Swift (2016), and refers to their measurement methods of R&D leap.The specific steps are shown as follows:

Step 1: Calculate the autoregressive model residual $u_{itn}$of the ith enterprise in year t and then proceed to the modeling of the next step;

Step 2: Calculate the GARCH model residual $e_{itn}$ of the ith enterprise in year t, which measures the degree to which the enterprise's R&D expenditure in the year deviates from the predicted value that shows its historical trend;

Step 3: Then, calculate the studentized residual $e_{itn}(stud)$ for the R&D expenditure GARCH model of the ith enterprise in year t for subsequent comparative research. The specific calculating formula is shown as follows:

$$e_{itn}(stud) = \frac{e_{itn}}{s_i\sqrt{(1-h_{int})}} \quad (1)$$

where $s_i$ is the standard deviation of $e_{itn}$ and $h_{int}$ is the impact of $u_{itn}$ of the ith enterprise in year t on the entire estimation.

Step 4: Compare the absolute value of studentized residuals of each enterprise during the ten years from 2011 to 2020 and find the maximum value $e_i(max)$ during the observation, which is the R&D leap of the ith enterprise.

### 3.2.4 Moderating Variable: Value Cognitive Complexity (Nc)

Based on the research of Nadkarni and Narayanan (2007), referring to the cod-ing research design of Wu (2011), this paper uses content research methods to depict the value cognitive complexity of Chinese enterprises in the R&D process. The value creation activities of the enterprise are divided into two aspects: one is the main activities (Np), including R&D, design, supply, production, marketing and service; The second is support activities (Ns), covering information, relationship, operation and manpower. For each sample enterprise, we measure the total number of concepts created by the enterprise value chain.

Step 1: Identify the statements in the annual report and social responsibility report. That is, read the company's annual report and corporate social responsibility report in the year of research and development, identify the statement segments related to the strategic innovation plan, and refer to the coding vocabulary summarized by Wu (2011) to record the statements of the annual report and social responsibility report on the main value creation and supporting factors in the innovation strategic plan segment.

Step 2: Calculate the complexity. After completing the above identification of the annual report and social responsibility report, this paper adds the number of main links and the number of support links to get the final total number of links according to the recorded phrases. This count is the value of cognitive complexity. The specific calculation formula is as follows:

$$Nc = Np + Ns \quad (2)$$

If the complexity value calculated finally is larger, it means that the enterprise considers more value creation links, which proves that the cognitive complexity of the enterprise in the decision-making process is higher.

The specific vocabulary is shown in Table 1

### 3.2.5 Control Variable

This study selects control variables based on the literature of innovation research. Firstly, the strategic deployment of an enterprise will affect its innovation output. Therefore, this paper selects the following four control variables: the proportion of independent directors (Indepe), the proportion of institutional ownership (INST), the proportion of state ownership (SOSP), and the dual role of the CEO (Dual). Secondly, since the innovation output of enterprises will be affected by enterprise resources, etc., this paper also regards the following as control variables: the age, the size, the asset-liability ratio (Lev), the bankruptcy distance (Zscore), and the growth. Finally, industry and year are taken as control variables, because they affect the innovation output of enterprises [3].

## 4 DATA RESULTS

### 4.1 Descriptive Statistics

This paper first performs descriptive analysis on the uncentered variables to obtain the average, standard deviation, etc., and then uses the Person correlation coefficient to describe the correlation between variables. It can be seen from Table 2 that the average values of Innovation capacity, absorptive capacity, R&D leap and cognitive value complexity are 2.712, 10.260, 2.201, 4.763 respectively. In addition, it can be seen from Table 2 that the correlation coefficients of most variables are less than 0.8. Then, we examined the variance inflation factors of all variables, and found that all VIF values are less than 5, and the average value is 1.35, which indicates that the model in this paper will not incur serious multicollinearity problems.

### 4.2 Hypothesis Testing

To avoid problems of heteroscedasticity, serial correlation and cross-sectional correlation caused by the panel data used by this study, this paper uses Driscoll-Kraay (referred to as D-K) standard error with stata17.0 for estimation to achieve unbiased, consistent and effective results. As the results of Hausman test denied the null hypothesis, we used a fixed effect model. In addition, the interaction variables in the model were centralized to avoid multicollinearity.

**Table 1:** Coding vocabulary of value creation link

| Value creation links | | Key words |
|---|---|---|
| Main links | R&D | Research, R&D, scientific research, manufacture, development, etc. |
| | Design | Design, planning, etc. |
| | Production | Processing, OEM, smelting, rough refining, refining, fabrication, assembly, synthesis, production, etc. |
| | Marketing | Publicity, development, expansion, promotion, |

| | | |
|---|---|---|
| | | market, marketing, advertising, brand, image, underwriting, etc. |
| | Supply | Exploration, mining, mining and beneficiation, procurement, purchase, transportation, logistics, freight, etc. |
| | Service | Maintenance, repair, installation, debugging, representative, technical service, technical support, etc. |
| | Information management | Information collection, collection, research, investigation, understanding, opportunities, risks, analysis, feedback, briefing, reporting, mastery, etc. |
| Support links | Relationship management | Contact, communication, coordination, relationship, organization, communication, cooperation, alliance, investment promotion, etc. |
| | Operation management | Supervision, supervisor, control, finance, operation, project management, etc. |
| | Manpower | Raising, recruitment, talents, education, training, exchange, assignment, labor, personnel, etc. |

**Table 2:** Descriptive statistics of variables and pearson correlation analysis

| Variable | IC | AC | RDL | Nc | Size | Age | Indepe | INST | SOSP | Growth | Lev | Dual | Zscore |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IC | 1 | | | | | | | | | | | | |
| AC | 0.022 | 1 | | | | | | | | | | | |
| RDL | 0.169*** | 0.013 | 1 | | | | | | | | | | |
| Nc | 0.215*** | -0.139*** | 0.045 | 1 | | | | | | | | | |
| Size | 0.616*** | -0.212*** | 0.200*** | 0.267*** | 1 | | | | | | | | |
| Age | 0.140*** | -0.136*** | 0.139*** | 0.067* | 0.282*** | 1 | | | | | | | |
| Indepe | -0.107*** | -0.034 | 0.010 | 0.051 | -0.074** | 0.258*** | 1 | | | | | | |
| INST | -0.059* | 0.040 | -0.151*** | -0.051 | -0.146*** | -0.289*** | -0.051 | 1 | | | | | |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SOSP | 0.061* | -0.040 | 0.093*** | 0.045 | 0.103*** | 0.016 | 0.115*** | 0.143*** | 1 | | | | |
| Growth | 0.016 | -0.080** | -0.077** | -0.057* | -0.051 | -0.156*** | -0.026 | 0.132*** | 0.076** | 1 | | | |
| Lev | 0.277*** | -0.392*** | 0.250*** | 0.318*** | 0.505*** | 0.167*** | -0.027 | -0.113*** | -0.016 | -0.062* | 1 | | |
| Dual | -0.212*** | 0.057* | -0.173*** | -0.079** | -0.277*** | -0.063* | 0.193*** | -0.053 | -0.136*** | 0.028 | -0.190*** | 1 | |
| Zscore | -0.207*** | 0.369*** | -0.199*** | -0.121*** | -0.432*** | -0.140*** | 0.022 | 0.135*** | -0.015 | 0.084** | -0.627*** | 0.207*** | 1 |
| Mean | 2.712 | 10.260 | 2.201 | 4.763 | 22.140 | 2.860 | 0.383 | 0.025 | 0.017 | 0.176 | 0.335 | 0.361 | 10.020 |
| S.D. | 1.837 | 9.295 | 3.486 | 1.835 | 1.233 | 0.304 | 0.062 | 0.060 | 0.065 | 0.286 | 0.179 | 0.480 | 11.480 |

**Table 3:** This caption has more than one line so it has to be set to justify.

| | Model（1） | Model（2） | Model（3） | Model（4） |
|---|---|---|---|---|
| Age | 0.003 | 0.155 | 0.209 | 0.213 |
| | (0.01) | (0.70) | (0.95) | (0.98) |
| Size | 0.831*** | 0.864*** | 0.862*** | 0.858*** |
| | (17.23) | (18.62) | (18.55) | (18.50) |
| LEV | -0.332 | 0.084 | 0.189 | 0.209 |
| | (-1.11) | (0.28) | (0.64) | (0.71) |
| Growth | -0.460*** | -0.343*** | -0.347*** | -0.347*** |
| | (-4.77) | (-3.53) | (-3.59) | (-3.58) |
| INST | 1.575** | 1.555** | 1.612** | 1.721** |
| | (2.15) | (2.15) | (2.25) | (2.40) |
| Indepe | -0.936 | -0.725 | -0.793 | -0.801 |
| | (-1.42) | (-1.14) | (-1.26) | (-1.29) |
| SOSP | -0.292 | -0.299 | -0.307 | -0.262 |
| | (-0.49) | (-0.52) | (-0.53) | (-0.46) |
| Dual | -0.109 | -0.102 | -0.122 | -0.116 |
| | (-1.31) | (-1.26) | (-1.49) | (-1.42) |
| Zscore | -0.001 | -0.004 | -0.006 | -0.005 |
| | (-0.17) | (-0.78) | (-1.03) | (-0.91) |
| AC | | 0.037*** | 0.038*** | 0.036*** |
| | | (5.92) | (6.41) | (6.22) |
| RDL | | | -0.030** | -0.022 |
| | | | (-1.99) | (-1.45) |
| AC_RDL | | | -0.004** | -0.004** |
| | | | (-2.49) | (-2.31) |

| | | | | |
|---|---|---|---|---|
| Nc | | | | -0.010 |
| | | | | (-0.54) |
| AC _Nc | | | | -0.000 |
| | | | | (-0.10) |
| RDL_Nc | | | | -0.004 |
| | | | | (-0.73) |
| AC_RDL_Nc | | | | 0.001* |
| | | | | (1.81) |
| cons | 1.904*** | 1.965*** | 1.969*** | 2.593*** |
| | (13.70) | (14.45) | (14.53) | (20.51) |
| year | Controlled | Controlled | Controlled | Controlled |
| IND | Controlled | Controlled | Controlled | Controlled |
| N | 672 | 672 | 672 | 672 |
| Wald $\chi^2$ | 728.65*** | 830.99*** | 872.47*** | 920.19*** |

#### 4.2.1 Testing of the Relationship between Absorptive Capacity and Innovation Capacity

It can be seen from the model (2) in Table 3 that the regression coefficient between the absorptive capacity and the Innovation capacity is 0.037, P<0.01. Thus, hypothesis 1 has been verified, that is, the absorptive capacity of the enterprise has a significant positive impact on the Innovation capacity. The stronger the enterprise absorptive capacity, the more effective it can convert external knowledge into internal capital, thus promoting its Innovation capacity.

#### 4.2.2 The Moderating Effect Of R&D Leap on the Relationship between Absorptive Capacity and Innovation Capacity

As seen from the model (3) in Table 3, the regression coefficient the product term of the absorptive capacity and R&D leap is -0.004, P<0.05. Thus, hypothesis 3 is verified. This shows that the R&D leap has a negative moderating effect on the relationship between absorptive capacity and innovation capacity, that is, when the R&D leap is low, the continuous improvement of absorptive capacity of the enterprise is conducive to the growth of its innovation capacity.

#### 4.2.3 The Impact of the Joint Interaction of R&D Leap and Value Cognition Complexity on Enterprise Absorptive Capacity and Innovation Capacity

As seen from the model (4) in Table 3, the regression coefficient of the cubic product term of enterprise absorptive capacity, R&D leap, and value cognition complexity is 0.001, P<0.1, indicating that the R&D leap and value cognition complexity will jointly affect the relationship between absorptive capacity and innovation capacity. In addition, as seen from Table 3, when the R&D leap is small and the complexity of value cognition is low, the stronger the absorptive capacity of the enterprise, the more it can improve its innovation capacity. That is, in the case of low R&D leap and value cognition complexity, the enterprise absorptive capacity and innovation capacity have a stronger positive relationship. Thus, hypothesis 3 is verified.

### 4.3 Robustness Verification

In order to verify the reliability of the above results, this paper replaces the data with a lag of one period with the data of Innovation capacity with a lag of two periods. After a regression

analysis of the model, we obtained Table 4 with consistent results, which indicates that the results have a strong robustness.

**Table 4** Robustness test and analysis results

| | Model（1） | Model（2） | Model（3） | Model（4） |
|---|---|---|---|---|
| Age | -0.156 | 0.044 | 0.113 | 0.129 |
| | (-0.63) | (0.18) | (0.46) | (0.53) |
| Size | 0.733*** | 0.776*** | 0.776*** | 0.786*** |
| | (14.96) | (16.52) | (16.43) | (16.50) |
| LEV | 0.753** | 1.047*** | 1.123*** | 1.169*** |
| | (2.30) | (3.28) | (3.53) | (3.63) |
| Growth | -0.101 | 0.006 | 0.016 | 0.016 |
| | (-0.97) | (0.05) | (0.16) | (0.15) |
| INST | 1.684* | 1.728** | 1.927** | 2.021** |
| | (1.93) | (2.01) | (2.28) | (2.38) |
| Indepe | 0.185 | 0.459 | 0.371 | 0.366 |
| | (0.27) | (0.68) | (0.56) | (0.54) |
| SOSP | -0.226 | -0.191 | -0.138 | -0.398 |
| | (-0.27) | (-0.23) | (-0.16) | (-0.48) |
| Dual | -0.178** | -0.175** | -0.199** | -0.185** |
| | (-1.96) | (-1.98) | (-2.24) | (-2.06) |
| Z_score | 0.008 | 0.005 | 0.002 | 0.002 |
| | (1.39) | (0.83) | (0.44) | (0.42) |
| AC | | 0.038*** | 0.040*** | 0.040*** |
| | | (5.38) | (5.96) | (5.90) |
| RDL | | | -0.037** | -0.034** |
| | | | (-2.35) | (-2.11) |
| AC_RDL | | | -0.004** | -0.004** |
| | | | (-2.49) | (-2.57) |
| Nc | | | | -0.010 |
| | | | | (-0.45) |
| AC_Nc | | | | 0.003 |
| | | | | (1.10) |
| RDL_Nc | | | | 0.010* |
| | | | | (1.76) |
| AC_RDL_ Nc | | | | 0.002** |
| | | | | (2.17) |
| cons | 2.617*** | 2.468*** | 2.510*** | 1.600*** |
| | (19.20) | (17.90) | (18.23) | (11.38) |
| year | Controlled | Controlled | Controlled | Controlled |
| IND | Controlled | Controlled | Controlled | Controlled |
| N | 672 | 672 | 672 | 672 |
| Wald $\chi^2$ | 595.83*** | 711.80*** | 751.88*** | 775.72*** |

## 5 CONCLUSION AND IMPLICATIONS

### 5.1 Conclusion and Discussion

From the perspective of punctuated equilibrium theory and value cognition, this paper analyses and examines the impact of enterprise absorptive capacity on Innovation capacity, and analyses

how the R&D leap moderates the relationship between absorptive capacity and Innovation capacity, as well as how the joint interaction of R&D leap and value cognition complexity regulates the above relationship. This paper comes into three conclusions. Firstly, the absorptive capacity of enterprises positively affects the Innovation capacity. Strong absorptive capacity means that the enterprise can adapt to changes in the innovation environment and technology more quickly, and can digest, integrate and utilize internal and external resources more effectively, so as to improve its adaptability, Innovation capacity, and competitiveness. Secondly, the R&D leap negatively moderates the relationship between absorptive capacity and Innovation capacity. Large R&D leap may be detrimental to the management and allocation of R&D resources, thus reducing the resources required for the growth of Innovation capacity. Thirdly, the joint interaction of value cognition complexity and R&D leap positively moderates the relationship between absorptive capacity and Innovation capacity.

### 5.2 Theoretical Contributions

Firstly, this research discusses for the first time the relationship between absorptive capacity and Innovation capacity using R&D leap amplitude as a situational variable, thus deepening research on punctuated equilibrium theory. Previous studies have shown that companies with large R&D leap need to coordinate and allocate resources, resulting in greater waste. According to the discontinuous balance theory, exploratory innovation and exploitative innovation alternate in time to achieve a balance [10]. Based on the typical environment of artificial intelligence enterprises, this paper expands the application scenarios of discontinuous equilibrium, sheds new light on the operating mechanism between the three, and proposes a new perspective for further study of the relationship between absorptive capacity and Innovation capacity.

Secondly, in response to the lack of research on the impact of value cognition complexity on the relationship between absorptive capacity and Innovation capacity, this study differs from previous research [6], by innovatively regarding value cognition complexity as a cognitive model under the innovation framework for further research and analysis. It is found that the joint interaction of value cognition complexity and R&D leap has a certain impact on the relationship between absorptive capacity and Innovation capacity. This paper systematically studies the moderating effect of contextual factors on the relationship between absorptive capacity and Innovation capacity. By analysing these moderating effects, this study, to a certain extent, explains the reasons for the divergence of existing research on the relationship between absorptive capacity and Innovation capacity, providing guidance for future research.

### 5.3 Limitations and Future Directions

This study has the following limitations: firstly, part of the data were obtained by hand-coding the annual reports and social responsibility reports of listed companies, which, to a certain extent, are subjective and biased; secondly, this study only measures the two variables of absorptive capacity and Innovation capacity from one perspective. In the future, the indicators can be considered from a multi-dimensional perspective, and the research can be deepened from more perspectives.

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