Frontiers in Business, Economics and Management
ISSN: 2766-824X | Vol. 21, No. 1, 2025

The Impact of Artificial Intelligence on Corporate Revenue Growth: Evidence from China

Ziyue Wang [a], Luanqing Wang [b]

The Affiliated High School to Hangzhou Normal University, Hangzhou, China

[a] 501591827@qq.com, [b] w17816867867@163.com

[*] These authors have equal contribution to this paper

Abstract: Technological innovation in the AI sector is rapidly advancing, with achievements like AI patents emerging as key assets in corporate competition. While the direct revenue from individual patents may be limited in the short term, leveraging them alongside traditional strengths such as enterprise scale has become a crucial strategic direction. Given the relatively weak immediate impact of AI patents on revenue, it is recommended that the government refine patent value orientation, foster collaborative applications, and enhance market integration. Enterprises should activate their existing patent portfolios, tap into their indirect value, and align them with service-oriented business models. Meanwhile, investors are encouraged to adopt broader evaluation criteria, recognizing the non-revenue contributions of patents based on industry characteristics. In this context, coordinated efforts among government, businesses, and investors are essential to reshape the current landscape.

Keywords: Artificial Intelligence; Corporate Revenue; China.

1. Introduction

In the course of an enterprise's development, evaluating its operational scale, development trends, and market competitiveness relies on key indicators, with corporate revenue (Geroski, Machin, and Walters, 1997) [1] standing as a core and indispensable metric. In today's society of rapid technological iteration, artificial intelligence (AI) has become the core engine driving industrial transformation, and the correlation between the number of AI patents (Abadi, Najaf, and Pecht, 2020) [2] and enterprise revenue levels has become increasingly prominent.

From the perspective of technological transformation, the accumulation of a large number of AI patents not only serves as a visual representation of an enterprise's R&D investment intensity and innovative capabilities but also signifies its ability to deeply integrate technological achievements such as algorithm optimization and machine learning models into its product portfolio. For example, developing intelligent quality inspection systems through computer vision patents or building intelligent customer service platforms based on natural language processing patents, such technological empowerment can significantly enhance product intelligence and user experience, form differentiated competitive barriers (Kitch, 1977) [3], and directly boost product sales growth.

At the level of patent operations, patent licensing is emerging as a new growth point for enterprise revenue (Roy, Robin, and Johann, 1997) [4]. When an enterprise's patents in fields such as image recognition and autonomous driving possess industry-wide applicability, the licensing fees charged to upstream and downstream enterprises in the industrial chain can generate a stable cash flow. Take a chip company as an example: by licensing its deep learning architecture patents to dozens of hardware manufacturers, its annual licensing revenue accounts for 15% of its total income. Meanwhile, a diverse patent portfolio can attract cross-industry collaborations—such as establishing joint laboratories with traditional manufacturing enterprises to obtain share-based profits through technology transfer. This "patent pool + ecological cooperation" model is reshaping the revenue structure of enterprises.

From the perspective of brand value, the number of AI patents serves as a visual label for an enterprise's technological moat. In investors' decision-making models, patent density has become a key parameter for evaluating the growth potential of technology companies; enterprises with a high number of patents often enjoy higher valuation premiums and financing convenience (Park and Lee, 2013) [5]. For consumers, a smart home appliance enterprise has created a brand image as a "smart living solutions provider" by leveraging more than 500 AI-related patents. The market share of its products equipped with independent patented technologies has increased by 22% over three years, fully demonstrating the guiding role of technological credibility in consumer choices. This value transmission from technical assets to brand assets is establishing a long-term mechanism for enterprise revenue growth.

2. Literature Review

Unlike studies on the relationship between total household savings and total household consumption, or between corporate product sales and advertising expenditure, which only require analyzing the direct impact of a single variable on the dependent variable without considering interference from other variables and can use simple linear regression, our research on the impact of artificial intelligence (AI) on corporate revenue needs to account for the fact that corporate revenue is influenced by multiple factors. Therefore, we need to analyze the combined effects of multiple variables on the dependent variable. To this end, we will construct a multiple linear regression model to quantify the marginal effects of explanatory variables such as the number of AI patents, corporate growth, size, and age, thereby analyzing how these variables influence corporate revenue (the dependent variable) (Uyanık and Neşe, 2013) [6].

Methods for studying the relationship between multiple independent variables (explanatory variables) and a single dependent variable primarily include the following categories: linear correlation methods linear regression models, nonlinear models, and other approaches such as structural equation modeling (Momeni et al., 2018) [7]. Linear correlation methods can only describe the correlation between variables, but our research requires exploring causal relationships among multiple variables, making these methods unsuitable. Additionally, since our study does not involve latent variables, there is no need to use structural equation modeling (Ullman and Bentler, 2012) [8].

Finally, in the field of business management, the relationships between many variables and revenue are often assumed to be linear or piecewise linear. Linear models are simple in structure, and their parameters (such as regression coefficients) can be directly interpreted as "the impact of a unit change in the variable on revenue", which aligns with the intuitive needs of "causal inference" in business analysis. This approach adheres to Occam's razor principle and statistical tests have not revealed significant nonlinear characteristics (Blumer and Warmuth, 1987) [9]. Therefore, we can directly use a linear regression model rather than a nonlinear one (Montgomery, Peck, and Vining, 2021) [10].

3. Data Description

We introduce the data source and highlight key features of the dataset, including variable definitions, sample coverage, and summary statistics. The data used in this study is comprehensive, capturing not only the impact of artificial intelligence (AI) on corporate revenue—measured by the number of AI patents held by firms—but also incorporating factors such as corporate growth, size, and age, as changes in a company's characteristics can also influence its revenue.

3.1. Number of AI Patents

We selected a large amount of data from companies in different provinces, including Sichuan, Hubei, Hangzhou, etc., and collected the number of AI patents applied for by these listed companies in the current year. We then continuously tracked the revenue of these listed companies in the following years to form a pooled cross-sectional dataset. Finally, by comparing them over time series and across multiple enterprises, we analyzed the impact of the number of AI patents on corporate revenue.

3.2. Corporate Growth

We assess a company's growth from multiple aspects, as it is also a key factor influencing corporate revenue. First, financial indicators, including revenue and profit growth rates, profitability metrics, and cash flow health. Second, the industry and market environment - if the market space is huge, leading companies can sustainably expand. Next, barriers to sustainable growth, such as the company's R&D capabilities, brand and market share, and business model advantages. More importantly, management and strategy - the company's prospects also depend on its strategic planning and employees' execution capabilities.

3.3. Corporate Scale

We analyze the impact of company size on long-term revenue from multiple perspectives. Larger companies enjoy lower procurement costs, stronger brand influence, and the ability to diversify into peripheral businesses based on their core operations—all of which contribute to revenue growth. However, excessive scale also brings challenges such as complex management structures, slower decision-making, and reduced sensitivity to market changes, which may ultimately constrain overall revenue.

3.4. Corporate Age

Established companies leverage decades of accumulated experience to optimize products and services, secure stable business operations through reliable partnerships, reduce costs, and sustain revenue growth via proven business models and strong brand reputations. Nevertheless, older firms often struggle with innovation stagnation and slow adaptation to emerging industry trends, factors that can impede revenue expansion.

4. Model and Empirical Results

4.1. Data Analysis

This paper takes listed companies from various provinces in China as samples and constructs panel data to analyze the changes of relevant variables over time. Among them, the core explanatory variable is the number of corporate artificial intelligence patents, the control variables are corporate size and age, and the explained variable is corporate growth.

Table 1. Summary Statistics

Variable	N	Mean	Min	Max
Newpatents	32,856	1.58	0	902.00
Growth	24,179	11.74	-1.81	20.10

During data processing, it is found that there are some missing values in the explained variable of corporate growth, mainly due to the fact that some enterprises did not disclose their financial statements for the year or were affected by other uncontrollable factors. Such data missing may have a certain impact on the analysis results, and in the subsequent analysis, we will conduct research based on the existing complete data.

From the perspective of the core explanatory variable, the average number of artificial intelligence patents of sample enterprises is 1.58. However, due to the influence of maximum values, this average cannot fully reflect the actual situation, and the overall level of actual patent quantity is lower. If we only look at enterprises with non-zero patent quantities, their average number of patents will be higher, which indicates that enterprises with patents do have a certain amount of investment and output in artificial intelligence innovation.

Looking at the explained variable of corporate growth, its average value is around 11.75%, and the standard deviation is small. This indicates that the revenue growth rate of most enterprises is relatively stable and in a relatively concentrated range, and it also shows that most enterprises with artificial intelligence patents have good growth. In order to more clearly see the relationship between artificial intelligence patents and corporate growth, we re-counted after excluding all enterprises with zero patent quantities and found that the average value of corporate growth has increased to a certain extent, the standard deviation has further decreased, meaning that the growth is more stable, and the minimum value has also significantly increased.

From the perspective of econometrics, this result initially shows that there is a positive correlation between the number of artificial intelligence patents and corporate growth.

However, this correlation still needs to exclude the influence of control variables such as enterprise size and age. Enterprises of different sizes and ages may have differences in the acquisition of artificial intelligence patents and corporate growth. In the subsequent analysis, we will include these control variables to more accurately examine the impact of artificial intelligence patents on corporate growth. Overall, the existing data indicate that artificial intelligence patents can promote the growth of corporate revenue and enhance corporate growth to a certain extent.

4.2. Model Estimation

To analyze the impact of the number of artificial intelligence patents, enterprise scale, and age on the growth rate of an enterprise's annual income, we will focus on the role of the number of patents through our analysis.

Among them, we corely focus on the impact coefficient of the number of patents on the income growth rate, which reflects the impact of the number of patents on the income growth rate. At the same time, we take into account the role of factors such as enterprise scale, enterprise age, and other unconsidered factors.

We have constructed the following model:

$$Y=\theta_0+\theta_1 P+\theta_2 Z+\varepsilon \quad (1)$$

Where: Y is Growth, that is, the growth rate of the company's annual income

P is the number of artificial intelligence patents

Z as a control variable, includes enterprise scale and age

θ_0 represents the intercept

ε denotes the error term

In the analysis, we first look at the correlation between variables through correlation coefficients and check for data problems. We calculate the impact coefficients under various circumstances, and compare the changes in the impact of the number of patents and the fitting effects under different circumstances.

The error analysis mainly checks whether the relevant assumptions are met: whether it is normally distributed, whether there is heteroscedasticity, and whether there is serial correlation, so as to ensure the reliability of the results. This is to clarify the actual impact of artificial intelligence patents on enterprise income growth and provide a reference for innovation decisions.

Table 2. Main Regression Results

	(1)	(2)	(3)
	Growth		
patent	0.084***	-0.007***	0.002***
	(0.007)	(.0003)	(0.001)
size		-0.48	0.052***
		(0.114)	(0.007)
age			0.247**
			(0.021)
constant/intercept	11.748***	11.305*	10.654*
	(0.008)	(0.052)	(0.075)
Obs	526	110	23,697

We have reported the correlation coefficients in the above content. Based on these coefficients, after statistical processing, we have calculated the standard errors and corresponding p-values under three scenarios respectively, which are summarized in the table below. As mentioned earlier, a smaller standard error indicates a smaller gap between the corresponding statistic (such as the sample mean) and the population parameter, less error generated during the sampling process, and naturally higher reliability of the statistical results. Therefore, we judge the authenticity of the data based on the magnitude of the p-values: when $p < 0.01$, the data reach the highest level of authenticity; when $p < 0.05$, the data have very high authenticity; and when $p < 0.1$, the data also have relatively high authenticity. From the statistical results, the significance levels reflected by the p-values corresponding to enterprise size and age are relatively low, which indicates that within the current analytical framework, these two factors do not show strong statistical significance in their impact on enterprise annual income, that is, their influence is relatively limited. In contrast, the p-value corresponding to the number of enterprise artificial intelligence patents shows a higher level of significance, indicating that it can be regarded as a relatively important factor affecting enterprise annual income.

Further analysis shows that, with other variables held constant, the model results indicate that for each additional artificial intelligence patent applied for by an enterprise, the average growth rate of the enterprise's annual income will increase by 0.2%. It is worth noting that this analytical conclusion is drawn based on sample data from 23,697 companies in the Chinese market, and thus has a certain degree of wide applicability.

However, this result needs to be viewed dialectically. From the perspective of the magnitude of the correlation coefficients, the number of artificial intelligence patents has only a weak correlation with enterprise income, while the correlations between enterprise size, age and enterprise income are much stronger. This phenomenon shows that in today's society where artificial intelligence is the mainstream development direction, relying solely on a single artificial intelligence patent cannot bring a very substantial increase in income to an enterprise. In contrast, the resources, channels and market influence accumulated by the enterprise's scale, as well as the experience and brand value accumulated by the enterprise in the long-term development process (i.e., with the increase of age), are still important factors affecting enterprise income. At the same time, we must not ignore the potential value of artificial intelligence patents. If an enterprise has strong innovation capabilities and can accumulate a large number of artificial intelligence patents to form a scale effect and technical barriers, this will undoubtedly become a significant advantage for the enterprise in market competition and provide strong support for its long-term development.

5. Conclusion

5.1. Summary

In the current AI landscape, technological innovation is accelerating continuously, with innovative achievements such as AI patents becoming important chips in corporate competition. Their influence is gradually emerging, but the short-term benefits of individual achievements are limited. Meanwhile, traditional factors like enterprise scale and development accumulation still play a significant role in the market, and the integration of AI with traditional advantages has become a key direction for enterprise development.

5.2. Policy Relevance

For the government, it is essential to optimize the orientation of patent value and curb ineffective investment. Policy incentives should shift from rewarding the sheer number of patents to supporting patent commercialization. For instance, enterprises that successfully convert patents into products or services, wichh is even with limited revenue contribution, could receive subsidies of 10%-15% of actual R&D expenses. This would help prevent a “flooding” of low-value patents created solely to obtain subsidies. At the same time, the government should promote the collaborative application of patents by encouraging the formation of cross-enterprise “patent alliances” and the sharing of non-core patents, thereby lowering R&D costs across firms. Additionally, strengthening market docking services is key. By identifying appropriate segmented markets for patents with limited direct revenue potential, the government can help enterprises find effective monetization channels.

For enterprises, revitalizing existing patents and exploring their indirect value is a strategic priority. Companies should conduct internal reviews to sort through their patent portfolios, eliminating outdated or inapplicable patents and reallocating saved R&D resources toward areas closely aligned with core business operations. Beyond direct monetization, patents can play a critical role in building customer trust, preventing infringement, and mitigating legal risks. Furthermore, enterprises can enhance revenue by bundling AI patents with complementary professional services such as consulting and training, which offers “patent authorization and service” packages that combine intellectual property with practical value delivery.

For stock investors, expanding evaluation criteria beyond traditional revenue-based indicators is increasingly important. Investors should consider how patents contribute to non-revenue values such as improving operational efficiency. For example, patents that help reduce energy consumption, even if not directly profitable, still hold investment value. Evaluations should also account for industry-specific dynamics. In sectors where AI patents have limited direct financial impact, it is more informative to assess whether companies are effectively integrating patents into supply chains or customer service strategies, rather than focusing solely on patent quantity.

References

[1] Geroski, Paul A., Stephen J. Machin, and Christopher F. Walters. "Corporate growth and profitability." The Journal of Industrial Economics 45.2 (1997): 171-189.

[2] Abadi, Hamidreza Habibollahi Najaf, and Michael Pecht. "Artificial intelligence trends based on the patents granted by the united states patent and trademark office." IEEE Access 8 (2020): 81633-81643.

[3] Kitch, Edmund W. "The nature and function of the patent system." the Journal of Law and Economics 20.2 (1977): 265-290.

[4] Roy, Robin, and Johann Ckh Riedel. "Design and innovation in successful product competition." Technovation 17.10 (1997): 537-594.

[5] Park, Seong Yeon, and Seung Wha Lee. “The Impact of Brand Crisis on Product Evaluation and Purchase Motivation: The Mitigating Role of Brand Credibility and Brand Affect." Journal of Global Scholars of Marketing Science: Bridging Asia and the World 23.2 (2013): 213-226.

[6] Uyanık, Gülden Kaya, and Neşe Güler. "A study on multiple linear regression analysis." Procedia-Social and Behavioral Sciences 106 (2013): 234-240.

[7] Momeni, Amir, et al. "Linear correlations." Introduction to Statistical Methods in Pathology (2018): 75-91.

[8] Ullman, Jodie B., and Peter M. Bentler. Structural equation modeling. Handbook of psychology, second edition 2 (2012).

[9] Blumer, Anselm et. al. "Occam's razor." Information processing letters 24.6 (1987): 377-380.

[10] Montgomery, Douglas, Elizabeth Peck, and Geoffrey Vining. Introduction to linear regression analysis. John Wiley & Sons, 2021.

Appendix

Stata:

```
sum
g patent_num = exp(Lnpatents)-1
sum patent_num
replace patent_num=int( patent_num )
tabulate patent_num
sum patent_num
sum Growth
reg Growth patent_num Size Age
reg Growth patent_num
reg Growth patent_num Size
```