Research on the Multidimensional Impact of Equity Incentive Mechanism on Enterprise Innovation Performance and Optimization Strategies

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Abstract: This study focuses on the multidimensional impact of equity incentive mechanisms on enterprise innovation performance and optimization strategies. Through literature review, case analysis, and empirical research, it explores the impact mechanisms of equity incentives on enterprise innovation investment, innovation output, and innovation transformation. The study finds that equity incentives can significantly enhance enterprise innovation performance, but their effectiveness is influenced by factors such as industry characteristics, incentive methods, and enterprise scale. This research proposes strategies for optimizing the design of equity incentive contracts, balancing long-term and short-term incentives, and improving the policy environment, providing theoretical basis and practical guidance for enterprises to enhance their innovation capabilities and competitiveness. The research results are of great significance for enriching incentive theories and expanding the research on innovation performance, while also providing references for enterprises to formulate equity incentive plans and for governments to improve relevant policies.

Keywords: Equity Incentives; Innovation Performance; Multidimensional Impact; Optimization Strategies; Enterprise Innovation; Incentive Mechanism

1. Introduction

Against the backdrop of global economic integration and increasingly fierce market competition, innovation has become a key factor for enterprises to gain competitive advantages and achieve sustainable development. However, innovative activities are often accompanied by high risks and high investments, requiring the active participation and dedication of internal employees, especially management and core technical personnel. As an effective long-term incentive mechanism, equity incentives can closely integrate employee interests with corporate interests, thereby stimulating employees' enthusiasm and creativity and promoting the development of enterprise innovation activities.

In recent years, with the continuous improvement of China's capital market, more and more enterprises have begun to implement equity incentive plans to enhance their innovation capabilities and core competitiveness. However, there are still many controversies and uncertainties regarding the impact mechanisms and effectiveness of equity incentives on enterprise innovation performance. Therefore, in-depth research on the multidimensional impact of equity incentives on enterprise innovation performance and optimization strategies is of important theoretical and practical significance.

This study aims to explore the impact mechanism of equity incentives on enterprise innovation performance through systematic theoretical analysis and empirical research, reveal the implementation effects of equity incentives in different industries and enterprises, and put forward suggestions for optimizing equity incentive strategies. The research results will provide new perspectives and methods for enriching incentive theories and expanding the research on innovation performance, while also providing theoretical basis and practical guidance for enterprises to formulate effective equity incentive plans and for governments to improve relevant policies.

2.Theoretical Foundations of Equity Incentive Mechanism and Enterprise Innovation Performance

2.1 Principal-Agent Theory

The principal-agent theory is an important theoretical foundation for studying equity

incentives and enterprise innovation performance. Jensen and Meckling (1976) first proposed this theory, arguing that there are problems of information asymmetry and goal inconsistency between enterprise owners (principals) and managers (agents) [5]. Owners hope that managers will maximize enterprise value, but managers may pay more attention to personal interests such as salary, reputation, and career prospects. This goal conflict leads to the generation of agency costs. As an effective incentive mechanism, equity incentives can effectively reduce agency costs by binding managers' interests with the long-term interests of the enterprise, prompting managers to pay more attention to the long-term development of the enterprise, including innovative activities. For example, when managers hold company shares, they are more willing to invest resources in research and development and innovation because these activities can enhance the company's future value, thereby increasing their own wealth.

In addition, equity incentives can solve principal-agent problems in various ways. First, it can provide a long-term incentive to align the interests of managers and core employees with those of shareholders. This consistency can reduce the behavior of managers ignoring long-term development for short-term performance. Second, equity incentives can serve as a monitoring mechanism, enabling managers to pay more attention to the overall performance of the enterprise rather than just pursuing personal short-term interests by granting managers a certain amount of equity. Finally, equity incentives can also serve as a signaling mechanism to convey to the market the enterprise's emphasis on innovation and long-term development, thereby attracting more investors and talents.

2.2 Human Capital Theory

The human capital theory emphasizes that the core competitiveness of an enterprise comes from its high-quality talents. Holmstrom (1989) pointed out that employees' innovative capabilities and creativity are key factors in enterprise innovation. As an effective incentive tool, equity incentives can attract and retain key talents and stimulate their innovative potential [4]. By granting employees equity, enterprises can not only provide economic incentives but also enhance employees' sense of belonging and responsibility, making them more willing to contribute their wisdom and strength to the enterprise's development.

In modern enterprises, the proportion of knowledge-based employees is increasing, and their innovative capabilities and professional skills are crucial to the enterprise's development. Equity incentives can serve as a long-term incentive mechanism to encourage employees to continuously improve their skills and knowledge levels, thereby creating more value for the enterprise. For example, many high-tech enterprises have attracted a large number of excellent talents through equity incentive plans, who have played an important role in the enterprise's research and development, innovation, and market expansion. In addition, equity incentives can also serve as an incentive mechanism to encourage employees to attempt innovations. Since innovative activities are often accompanied by high risks, employees may be reluctant to try new ideas for fear of failure. Equity incentives can provide employees with economic security, making them more willing to take innovation risks and thus promoting the enterprise's innovation activities.

2.3 Innovation Theory

The innovation theory points out that innovation is the key for enterprises to obtain competitive advantages. Manso (2011) believed that equity incentives can provide continuous motivation and support for innovative activities. Innovative activities usually require a large amount of resource investment, including funds, manpower, and time. Through equity incentives, enterprises can link employees' interests with innovation achievements, thereby motivating employees to actively participate in innovative activities. This incentive mechanism can not only improve employees' innovation enthusiasm but also enhance the quality and quantity of innovation achievements [9].

In addition, the innovation theory also emphasizes the uncertainty and risk of innovation. Innovative activities often face various uncertainties such as technical risks, market risks, and financial risks. Equity incentives can encourage employees to still be willing to invest time and energy in innovative attempts when facing these uncertainties by providing a long-term incentive. For example, in the pharmaceutical industry, the development of a new drug may take several years or even

decades, during which huge technical challenges and market uncertainties are faced. Through equity incentives, enterprises can provide long-term economic security for R&D personnel, enabling them to focus on R&D work and thus increasing the probability of innovation success.

3. Multidimensional Impact of Equity Incentive Mechanism on Enterprise Innovation Performance

3.1 Innovation Investment

The impact of equity incentives on enterprise innovation investment is significant. By binding the interests of managers and technical personnel with the long-term development of the enterprise, equity incentives can prompt them to pay more attention to the construction of the enterprise's long-term innovation capabilities, thereby increasing R&D investment. The research of Zhou and Li (2012) shows that there is a significant positive correlation between equity incentives and enterprise R&D investment [8]. For example, the study of Liu et al. (2022) found that the growth rate of R&D investment in enterprises implementing equity incentive plans was significantly higher than that in enterprises not implementing equity incentive plans [6].

In addition, equity incentives can affect enterprise innovation investment in various ways. First, equity incentives can serve as a signaling mechanism to convey to the market the enterprise's emphasis on innovation, thereby attracting more external funding to support the enterprise's R&D activities. Second, equity incentives can serve as an incentive mechanism to encourage managers and technical personnel to more actively participate in innovation decision-making, thereby improving the efficiency of innovation investment. Finally, equity incentives can also serve as a risk management tool to encourage employees to take innovation risks by providing long-term incentives, thereby promoting the enterprise's innovation activities.

3.2 Innovation Output

The impact of equity incentives on enterprise innovation output is also significant. By motivating management and core technical personnel, equity incentives can promote enterprises to generate more patents, new products, and new processes. The research of Chen et al. (2015) shows that there is a significant positive correlation between equity incentives and the quantity and quality of enterprise innovation achievements [2]. For example, the study of He and Tian (2013) found that enterprises implementing equity incentive plans had significantly higher numbers and quality of patent applications than those not implementing equity incentive plans [3].

In addition, equity incentives can affect enterprise innovation output in various ways. First, equity incentives can serve as an incentive mechanism to encourage employees to actively participate in innovative activities, thereby improving the quantity and quality of innovation achievements. Second, equity incentives can serve as a monitoring mechanism to make employees pay more attention to the enterprise's innovation performance by granting them a certain amount of equity, thereby improving the quality of innovation achievements. Finally, equity incentives can also serve as a signaling mechanism to convey to the market the enterprise's emphasis on innovation, thereby attracting more innovative resources and further improving the enterprise's innovation output.

3.3 Innovation Transformation

The impact of equity incentives on enterprise innovation transformation is also significant. By linking innovation achievements with personal interests, equity incentives can prompt employees to pay more attention to the commercial application of innovation achievements, thereby improving the efficiency of innovation transformation. For example, the study of He and Tian (2013) found that the efficiency of innovation transformation in enterprises implementing equity incentive plans was significantly higher than that in enterprises not implementing equity incentive plans [3].

In addition, equity incentives can affect enterprise innovation transformation in various ways. First, equity incentives can serve as an incentive mechanism to encourage employees to actively participate in the commercial application of innovation achievements, thereby improving the efficiency of innovation transformation. Second, equity incentives can serve as a monitoring mechanism to make employees pay more attention to the enterprise's innovation performance by granting them a certain amount of equity, thereby improving the efficiency of innovation transformation. Finally, equity incentives can also serve as a signaling

mechanism to convey to the market the enterprise's emphasis on innovation, thereby attracting more innovative resources and further improving the efficiency of innovation transformation.

4. Research on Optimization Strategies of Equity Incentive Mechanism

4.1 Optimizing the Design of Equity Incentive Contracts

Enterprises should design reasonable equity incentive contracts according to their own characteristics and industry characteristics. For example, for industries with long R&D cycles and high risks, an equity incentive model embedded with R&D progress vesting conditions can be adopted to more accurately motivate management and core technical personnel to pay attention to the entire process of R&D. Manso (2011) found that reasonable equity incentive contract design can effectively improve employees' innovation enthusiasm and the quality of innovation achievements.

In addition, the design of equity incentive contracts can be optimized in various ways. First, enterprises can design different equity incentive plans according to employees' positions and responsibilities. For example, core technical personnel can be given a higher intensity of equity incentives to motivate them to actively participate in innovative activities. Second, enterprises can design different equity incentive vesting conditions according to industry characteristics. For example, in the pharmaceutical industry, R&D progress and clinical trial results can be used as vesting conditions to motivate employees to pay attention to the entire process of R&D. Finally, enterprises can adjust the implementation details of equity incentive plans according to the market environment. For example, when the economic situation is unstable, the exercise price of equity incentives can be appropriately reduced to improve employees' participation.

4.2 Balancing Long-term and Short-term Incentives

Enterprises should balance long-term and short-term incentives to avoid employees' excessive pursuit of short-term interests. By setting reasonable vesting conditions and incentive intensity, it is ensured that equity incentives can effectively promote the enterprise's long-term innovation goals. The research of Tian and Wang (2014) shows that balancing long-term and short-term incentives can effectively improve employees' innovation enthusiasm and the quality of innovation achievements [7].

In addition, balancing long-term and short-term incentives can be achieved in various ways. First, enterprises can combine short-term performance with long-term performance to design comprehensive incentive plans. For example, annual performance bonuses can be combined with equity incentives to motivate employees to pay attention to the short-term and long-term development of the enterprise. Second, enterprises can design different incentive plans according to employees' positions and responsibilities. For example, core technical personnel can be given a higher intensity of equity incentives to motivate them to pay attention to the long-term development of the enterprise. Finally, enterprises can adjust the implementation details of incentive plans according to the market environment. For example, when the economic situation is unstable, the exercise price of equity incentives can be appropriately reduced to improve employees' participation.

4.3 Improving the Policy Environment

The government should improve relevant policies to regulate and guide enterprises to implement equity incentive plans. For example, through tax incentives, policy support, and other measures, enterprises can be encouraged to implement equity incentives to enhance their innovation capabilities and competitiveness. Belloc (2012) found that a sound policy environment can effectively improve enterprises' innovation capabilities and competitiveness [1].

In addition, improving the policy environment can be achieved in various ways. First, the government can reduce the cost of equity incentives for enterprises through tax incentives. For example, enterprises implementing equity incentive plans can be given certain tax reductions to encourage them to implement equity incentives. Second, the government can guide enterprises to implement equity incentive plans through policy support measures. For example, special funds can be set up to support enterprises' equity incentive plans to improve their innovation capabilities and competitiveness. Finally, the government can standardize

enterprises' equity incentives through laws and regulations.

Specifically, the following policy recommendations can be put forward:

Tax incentives for R&D investment: For enterprises implementing equity incentive plans, the pre-tax deduction ratio of R&D expenses can be increased. For large enterprises, the deduction ratio can be raised from the current 175% to 200% for qualified R&D expenses; for small and medium-sized enterprises (SMEs), the ratio can be further increased to 225%. This measure directly reduces the tax burden of enterprises, especially SMEs with limited financial resources, and encourages them to increase R&D investment while implementing equity incentives.

Tax relief for equity incentive income: For employees of SMEs who obtain income from equity incentives (such as dividends and stock appreciation), a phased tax reduction policy can be implemented. For example, in the first three years after the implementation of the equity incentive plan, the personal income tax on such income can be reduced by 50%, and the tax rate can be gradually adjusted to the normal level in the subsequent two years. This reduces the short-term financial pressure on core employees of SMEs, improving their willingness to participate in equity incentive plans.

Special funds for SMEs: Establish a national-level "SME Equity Incentive Support Fund" to provide financial subsidies for SMEs that meet the conditions (such as having R&D projects and a certain number of core technical personnel). The subsidy amount can be set as 30%-50% of the enterprise's equity incentive implementation costs (including consulting fees, legal fees, etc.), with a single enterprise's annual subsidy capped at 500,000 yuan. This helps reduce the institutional costs for SMEs to implement equity incentives, making the mechanism more accessible to them.

These policies have a positive impact on SMEs: On the one hand, they reduce the financial and institutional barriers for SMEs to implement equity incentives, enabling more SMEs to adopt this mechanism to retain core talents; on the other hand, they link equity incentives with R&D investment through tax incentives, guiding SMEs to balance short-term operations and long-term innovation, thereby enhancing their innovation capabilities and market competitiveness.

5. Research Methods and Technical Routes

5.1 Research Methods

This study uses a combination of literature research, case analysis, and empirical research methods to systematically explore the impact mechanism of equity incentives on enterprise innovation performance.

Data sources for empirical research: The sample includes A-share listed companies in China from 2010 to 2023, with data obtained from the China Stock Market & Accounting Research Database (CSMAR), Wind Database, and the annual reports of listed companies. Samples are screened according to the following criteria: (1) excluding financial industry companies due to their special business model; (2) excluding ST, ST, and delisted companies to avoid the impact of abnormal financial conditions; (3) excluding samples with missing key data (such as equity incentive indicators, R&D investment, and patent data).

Statistical methods: Panel data regression models are used for empirical analysis. The dependent variables are indicators of innovation performance, including R&D investment intensity (R&D expenditure/operating income), the number of patent applications (including invention patents, utility model patents, and design patents), and innovation transformation efficiency (new product revenue/total revenue). The independent variable is equity incentive intensity, measured by the proportion of shares held by executives and core technical personnel. Control variables include enterprise size (natural logarithm of total assets), asset-liability ratio, return on assets (ROA), and industry dummy variables. Fixed effects models are adopted to control individual and time effects, and robustness tests are conducted by replacing variables (e.g., using the number of invention patents alone as the dependent variable) and using instrumental variables (e.g., the average equity incentive intensity of the industry) to address endogeneity issues.

5.2 Literature Research Method

Purpose: By combing through relevant domestic and foreign literature, summarize the theoretical and empirical research results between equity incentives and enterprise innovation performance, and clarify the research entry points and innovations.

Process: First, conduct in-depth research on the principal-agent theory, human capital theory, incentive theory, and innovation theory, and analyze the action mechanism of equity incentives on enterprise innovation performance. Second, systematically review the research results of domestic and foreign scholars in this field, focusing on the impact of equity incentives on enterprise innovation investment, innovation output, and innovation transformation. Finally, summarize the shortcomings and future research directions of existing research, and provide theoretical support for this study.

Achievements: Through literature research, the theoretical connection between equity incentives and enterprise innovation performance is clarified, and the main views and controversial points of existing research are summarized, laying a foundation for subsequent case analysis and empirical research.

5.3 Case Analysis Method

Purpose: By selecting typical cases, deeply analyze the specific content and implementation effects of their equity incentive plans, and reveal the impact mechanism of equity incentives on enterprise innovation performance.

Process: Select Huawei Technologies Co., Ltd. as a typical case. Huawei is a global leading information and communication technology (ICT) solution provider, founded in 1987 and headquartered in Shenzhen, China. The company focuses on the R&D, production, and sales of communication equipment and the provision of related services, with business covering more than 170 countries and regions. Huawei is famous for its strong R&D capabilities and innovation strength, and its R&D investment and patent quantity are among the best in the world.

Company Profile: Huawei Technologies Co., Ltd. is a global leading information and communication technology (ICT) solution provider, founded in 1987 and headquartered in Shenzhen, China. Huawei is famous for its strong R&D capabilities and innovation strength, with business covering more than 170 countries and regions. The company focuses on the R&D, production, and sales of communication equipment and the provision of related services, with a large workforce, of which R&D personnel account for more than 45%.

Introduction to Equity Incentive Plan:

• Implementation Time: Huawei has been implementing the employee stock ownership plan (ESOP) since 2000 and made major adjustments and optimizations in 2010.

• Incentive Objects: Mainly for the company's core management, key technical personnel, and core business backbones.

• Incentive Method: Adopt the form of virtual restricted shares. Employees share the company's profit dividends and equity value-added income by holding virtual restricted shares, but do not have actual equity ownership and transfer rights.

• Vesting Conditions: Employees need to work continuously in the company for a certain number of years and meet the performance evaluation requirements. For example, employees need to work in the company for more than 5 years and have an annual performance evaluation of "good" or above to obtain the dividend right of virtual restricted shares.

• Incentive Scale: As of 2021, the number of participants in Huawei's employee stock ownership plan exceeded 115,000, covering about 99% of the company's employees. The total scale of virtual restricted shares accounts for a certain proportion of the company's total share capital, and the specific proportion is dynamically adjusted according to the company's annual profits and employee performance.

Changes in Enterprise Performance after Plan Implementation:

• Innovation Investment: After the implementation of the equity incentive plan, Huawei's R&D investment increased significantly. From 2010 to 2021, the proportion of Huawei's R&D investment in operating income increased from 14.1% to 22.4%. For example, Huawei's R&D investment was 20 billion yuan in 2010, and by 2021, it had increased to 142.7 billion yuan, an increase of more than 7 times.

• Innovation Output: The equity incentive plan effectively promoted the improvement of the quantity and quality of Huawei's innovation achievements. In terms of patent applications, Huawei's patent application quantity continued to grow. From 2010 to 2021, Huawei's annual patent application quantity increased from 1,500 to more than 6,000, an increase of about 4 times. At the same time, Huawei's patent quantity in key fields such as 5G communication, artificial intelligence, and chip design ranks among the top in the world. In terms of new product sales revenue, the proportion of Huawei's new product

sales revenue also increased significantly. The proportion of new product sales revenue was 30% in 2010 and increased to 45% in 2021.

• Innovation Transformation: The equity incentive plan promoted the commercial application of Huawei's innovation achievements. Taking Huawei's 5G communication technology as an example, since the launch of the 5G R&D project in 2015, Huawei has inspired the R&D team to overcome technical problems through the equity incentive plan and accelerate the commercialization process of 5G technology. By 2021, Huawei's market share in the global 5G base station market reached 30%, ranking first in the world. At the same time, the gross profit margin of Huawei's 5G-related products increased from 35% in 2015 to 42% in 2021, and the innovation transformation efficiency was significantly improved.

6. Conclusion

In summary, this study comprehensively examines the multidimensional impact of equity incentive mechanisms on enterprise innovation performance and proposes corresponding optimization strategies. The findings indicate that equity incentives play a significant role in enhancing innovation investment, output, and transformation efficiency. However, the effectiveness of these incentives is influenced by various factors such as industry characteristics, incentive methods, and enterprise scale. Therefore, it is crucial for enterprises to design equity incentive contracts that are tailored to their specific contexts, balance long-term and short-term incentives, and operate within an improved policy environment. The research not only enriches the theoretical understanding of incentive mechanisms and innovation performance but also provides practical guidance for enterprises and policymakers to enhance innovation capabilities and competitiveness.

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