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QUALIFICATION WORK

Education Degree - Master

on: **GENDER-ORIENTED APPROACH IN
ADMINISTRATIVE MANAGEMENT**

Completed: student of
073 «Management» (EP «Administrative Management»)

LIU LU

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Faculty Economics and Management
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TASK

on qualification work for student

LIU LU

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Supervisor Tetiana Kharchenko, Doctor of Public Administration, Associate Professor

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2. Deadline for student completed project (work) August, 28, 2024

3. Background to the project (work):

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The analyse the actual problems of the gender equality. Its increasingly aware of the need to address gender differences in the workplace. Research a role in shaping policies and practices that promote gender equality and create favorable work environments for all employees. The analyse the definitions and basic principles of a gender-oriented approach, a gender-based management approach designed to eliminate gender inequality and promote gender equality

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CALENDAR PLAN

№	Title the stages of the degree project (work)	Date of performance project stages	Note
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2	Selection and analysis of literary sources, the preparation of the first theoretical chapter	December 2023	done
3	Preparation and presentation of draft of the first chapter of the thesis	January 2024	done
4	Collection and processing of factual material, synthesis analysis of application issues in the enterprise	February 2024	done
5	Making the theoretical part of the thesis, summarizing the analytical part	March 2024	done
6	Design options improve the research problem	April 2024	done
7	Completion of the project part of the thesis, design chapters	May 2024	done
8	Previous work and its defense review	June 2024	done
9	Checking the authenticity of the thesis	July 2024	done
10	Deadline for student completed the thesis	August 2024	done
11	Defense of the thesis	September 12 2024	done

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SUMMARY

LIU LU. Gender-oriented approach in administrative management.

Master's thesis in the specialty 073 «Management», EP «Administrative Management» SNAU, Sumy-2024 - Manuscript.

For a long time, due to objective physical differences, the physical strength is usually inferior to men, which results in a society dependent on physical labor, creating far less wealth than men, forming a male-dominated society. In such a society, she is deprived of the right to participate in social production, and she can only educate her children and take care of her husband at home. A gender-oriented approach will be applied in the administration, and managers will need to face gender differences and adopt a series of measures and policies to ensure gender equality and create a more inclusive and friendly working environment.

The first part of this paper is to explore the relevance and implications of a gender-oriented approach in administration. Gender equality has gained much attention in recent years, and organizations are increasingly aware of the need to address gender differences in the workplace. Managers play a key role in shaping policies and practices that promote gender equality and create favorable work environments for all employees. The second part introduces the definitions and basic principles of a gender-oriented approach, a gender-based management approach designed to eliminate gender inequality and promote gender equality. It emphasizes the inclusion of gender factors in decision-making, policy, and practice and the measures to eliminate gender differences and bias. Also, it discusses the practical application of the gender-oriented approach in various aspects of administration, including recruitment and recruitment, talent development, promotion, and workplace culture. It will highlight the importance of inclusion policies and practices that ensure equal access for men and women, considering their different experiences, skills and perspectives. The third part investigates the challenges a gender-oriented approach may face in practice, such as difficulties in changing cultural beliefs and attitudes. It proposes corresponding measures, such as conducting gender-awareness education and the establishment of equal opportunity institutions. In conclusion, this paper hopes that managers are able to create a fairer working environment and achieve gender equality through a gender-oriented approach.

Keywords: gender-oriented approach, administration, gender equality, inclusive policy.

АНОТАЦІЯ

ЛЮЙ ЛУ. Гендерно-орієнтований підхід в адміністративному менеджменті.

Магістерська робота за спеціальністю 073 "Менеджмент", ОП "Адміністративний менеджмент" СНАУ, Суми-2024 - Рукопис.

Гендерно-орієнтований підхід буде застосований в адміністрації, і керівники повинні будуть зіткнутися з гендерними відмінностями та прийняти низку заходів і політик для забезпечення гендерної рівності та створення більш інклюзивного та дружнього робочого середовища. У першій частині роботи розглядається актуальність і наслідки гендерно-орієнтованого підходу в управлінні. Останніми роками питання гендерної рівності привернуло багато уваги, і організації все більше усвідомлюють необхідність вирішення гендерних відмінностей на робочому місці. Менеджери відіграють ключову роль у формуванні політики та практики, які сприяють гендерній рівності та створюють сприятливе робоче середовище для всіх працівників.

Друга частина ознайомлює з визначеннями та основними принципами гендерно-орієнтованого підходу, гендерно-орієнтованого підходу до управління, покликаного усунути гендерну нерівність і сприяти гендерній рівності. У ній наголошується на включенні гендерних факторів у процес прийняття рішень, політики та практики, а також на заходах щодо усунення гендерних відмінностей і упереджень. Також досліджується практичне застосування гендерно-орієнтованого підходу в різних аспектах управління, включаючи наймання та підбір персоналу, розвиток талантів, просування по службі та культуру на робочому місці. Це підкреслить важливість політики та практики інклюзії, які забезпечують рівний доступ для чоловіків і жінок, враховуючи їхній різний досвід, навички та погляди.

У третій частині досліджуються труднощі, з якими може зіткнутися гендерно-орієнтований підхід на практиці, наприклад труднощі зі зміною культурних переконань і ставлень. Він пропонує відповідні заходи, такі як проведення гендерної освіти та створення інститутів рівних можливостей. На завершення в цьому документі сподіваються, що менеджери зможуть створити більш справедливе робоче середовище та досягти гендерної рівності за допомогою гендерно-орієнтованого підходу.

Ключові слова: гендерно-орієнтований підхід, адміністрування, гендерна рівність, інклюзивна політика.

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INTRODUCTION

Relevance of the topic. Relevance of the topic. In today's global economic environment, gender equality has become a key indicator of corporate social responsibility and governance maturity. The promotion of gender equality is not only related to the social justice, but also directly affects the comprehensive performance of enterprises. A number of studies have shown that the improvement of gender equality within enterprises can significantly enhance innovation ability, improve teamwork efficiency, and promote the diversification of corporate culture, which directly or indirectly affect the financial performance and market competitiveness of enterprises.

The enhancement of gender diversity in management and decision-making teams has proved to improve corporate problem-solving skills and innovative thinking. Christina Lagarde, former head of the International Monetary Fund (IMF), stressed that gender equality is not only a moral or social obligation, but also a potential driver of economic growth. For example, McKinsey research revealed that companies with a high percentage of management tend to be more innovative and organizational efficient than the industry average.

Given that consumers control about 70% of global consumer spending, companies' gender equality in management and key decision-making positions enables them to more effectively understand and grasp consumer needs and preferences. This has direct positive effects on the optimization of product design and marketing strategies. Especially in tourism, despite accounting for more than half of the workforce, the proportion of senior management and decision-making levels is relatively low. Increasing this proportion will not only enhance the response to the market, but also may improve the service innovation and competitiveness of the entire industry.

Although the economic benefits of gender equality have been confirmed in multiple studies, the gender gap remains globally. The World Economic Forum report shows that gender inequality remains deeply rooted in multiple areas, including

politics, economy, education and health. Especially in technology and senior management positions, the proportion is still far lower than in men.

The purpose and objectives of the study. The purpose of study is analyzing the actual problems of the gender equality. Its increasingly aware of the need to address gender differences in the workplace. Research a role in shaping policies and practices that promote gender equality and create favorable work environments for all employees. The analyze the definitions and basic principles of a gender-oriented approach, a gender-based management approach designed to eliminate gender inequality and promote gender equality.

The object of study is the impact of gender-oriented approach in administrative management.

The subject of research is the system of the gender-oriented approach in administrative management of Xingang Group.

Research methods: This study uses a multi-methodological research framework, combining qualitative and quantitative analyses to deeply explore the relationship between gender equality and enterprise performance. This comprehensive approach allows research to fully capture the performance of gender diversity in management and its impact on the operating results of Xingang Group. In-depth analysis of gender distribution and management strategies within Xingang Group, and evaluate the implementation effect and challenges of these strategies. Design and distribute questionnaires to collect the views of Xingang Group employees, especially employees, on career equality, career development opportunities and job satisfaction. Multiple regression analysis and two-stage least squares (2 SLS) analysis were conducted using statistical software to determine the specific impact of gender diversity on enterprise performance.

The database includes scientific research achievements of scientists at home and abroad in problem areas, national statistical report data, world statistical report data, publication of official and scientific journals, report information of enterprise manufacturers, and information of international and Chinese science time conferences.

Scientific novelty of the results is a system of basic indicators for evaluating changes in the implementation of Xingang Group's gender equality policy.

The practical significance of the results is the formation of model for how evaluate the changes before and after the implementation of the gender equality policy by Xingang Group.

Personal Achievements:

1 LIU LU Gender and corporate strategic decisions. *Modern aspects of modernization of science: status, problems, development trends*. Materials of the 35th International Scientific and Practical Conference August 8, 2023, Istanbul (Turkey). C. 201-204.

2 LIU LU Corporate culture and employee behaviour from the perspective of gender. *Економіка підприємства: сучасні проблеми теорії та практики*: Матеріали дванадцятої міжнар. наук.-практ. конф., 8 вересня 2023 р. Одеса: ОНУ, 2023. С. 365 - 367.

The structure and scope of work. Qualification work consists of an introduction, three chapters, conclusions and suggestions, a list of references, which consists of 29 titles. The main text is placed on 72 pages of computer text, the work contains 14 tables, 1 figure.

CHAPTER 1

THEORETICAL FRAMEWORK OF GENDER-ORIENTED APPROACH IN ADMINISTRATIVE MANAGEMENT

In the framework of exploring gender differences and management theory, social construction theory provides a key perspective for understanding the role of gender in organizational behaviour and management practice. Social construction theory holds that gender differences are not biological necessity, but constructed through social interactions and cultural practices. This theoretical perspective is particularly important for the analysis of the management's gender structure and its impact on organizational strategy and performance.

According to Wang's research, social construction theory can be effectively applied to role-playing activities in the educational field through which students can learn and internalize gender roles in an informal setting [1]. In the field of management, the application of this theory is equally applicable to the analysis and deconstruction of gender role prepositions in organizations that often affect career paths and promotion opportunities in enterprises.

In his research, An Zhiwen further emphasized the role of sound social theory in construction, pointing out that the interaction between social structure and individuals plays a key role in the cognition and expectation of plasticity [2]. This is particularly prominent in business management, where corporate culture and policies often inadvertently reinforce gender stereotypes, thus limiting the realization of gender equality.

Ding Hongxia's research explores the application of social constructivism in online teaching, highlighting how the traditional educational model and expectations of gender roles can be changed through interactive learning [3]. By applying this theory to business management, we can see that it is possible to promote gender equality within the organization and improve the representation of the management.

Alenezi From the perspective of technology, the research explores how cloud computing technology can support teaching and learning based on social constructivism, and emphasizes how technology can be used as a tool of change, to promote gender equal educational opportunities [4]. In the enterprise environment, this indicates that a more equal and inclusive work environment can be constructed through technology integration and intelligent management, where gender differences are recognized and reshaped.

In conclusion, the social construction theory of gender differences provides a theoretical basis for understanding and coping with gender issues in management practice. By criticizing and reflecting on existing gender structures, management theory and practice can address gender equality issues more deeply, promoting gender diversity and inclusiveness within enterprises.

The discussion of modern management theory on gender equality shows that gender diversity not only affects the dynamics of teams and organizations, but also has a profound impact on management practices and organizational effectiveness. These theories emphasize the integration of concepts of gender equality in corporate governance, leadership style, and decision-making processes, aiming to promote more comprehensive and innovative management practices.

Yu Yan's research focuses on how to improve the human resources of power supply enterprises through modern management theory, and emphasizes the important role of gender diversity in improving the operation efficiency of enterprises [5]. By promoting the equal participation of men and women, power supply enterprises can make better use of all talent resources, so as to improve the service quality and customer satisfaction.

Cao Lin Lin discussed the issue of cross-border e-commerce between China and ASEAN, and mentioned how modern management theory can help solve the challenges posed by gender inequality [6]. The article pointed out that on cross-border e-commerce platforms, the promotion of gender equality helps to create a more open and inclusive business environment, which is crucial to enhancing the international competitiveness of enterprises.

Zhalidak The research examines modern management theory from a more macro perspective, and puts forward that the characteristics of the development of management theory include the emphasis on gender equality, which is reflected in the support for gender diversity in organizational culture and policy making [7]. This view highlights that understanding and implementing gender equality strategies is integral to the long-term success of businesses in today's rapid development of globalization.

When exploring the application of modern project management theory in engineering management, Kena Chen analyzed how gender equality affects the success rate of projects. Research shows that gender equality not only promotes a broader perspective and more balanced team decision-making, but also improves the efficiency and effectiveness of project management.

In summary, gender equality in modern management theory emphasizes the importance of systematically integrating gender equality in corporate policy and culture. By implementing these strategies, organizations can not only improve their innovation ability and market adaptability, but also enhance their overall organizational health and employee satisfaction. Gender equality has become an integral part of modern management practice and is a key factor in driving the organization to become more just and effective.

In the process of enterprise strategic decision-making, gender factor is gradually considered as a key dimension affecting enterprise competitiveness. Research in this area shows that gender diversity can not only enrich the decision-making process, but also enhance the ability of enterprises to adapt to market changes and overall innovation.

The study of Li Zijian and Niu Guihong reveals the relationship between the gender difference of the management team and the strategic change through the empirical analysis of the listed manufacturing companies. Their research shows that the gender-diverse management team is more efficient and innovative in promoting strategic change and enhancing corporate competitiveness [8]. This finding supports the important role of gender diversity in corporate strategy development.

Bai Yu's research discusses how gender factors influence corporate strategic decisions from the perspective of cognitive bias and risk judgment. Studies have shown that gender-diverse teams are able to present a broader perspective and a more balanced risk assessment when assessing risk and when making decisions, thus avoiding strategic errors due to cognitive bias [9]. This emphasizes the practical value of gender equality in optimizing decision quality

Two papers by Quan Chao analyze the role of financial management in enterprise strategic decision-making, and suggest how gender diversity can improve the quality of decision-making by improving the financial management function. He pointed out that gender diversity in the financial decision-making process can enhance the team's innovation ability and improve the accuracy and efficiency of financial decisions [10].

Deng Shoubin's research further emphasizes the important position of financial management in corporate strategy, and discusses how gender diversity can enhance the application value of financial management. By incorporating a gender perspective into financial management, companies can more comprehensively take into account different consumer groups and market needs, which is crucial to the development of effective market strategies and financial plans [11].

Together, these studies paint a complex picture of gender factors in corporate strategic decisions, suggesting that gender diversity is not only an embodiment of social responsibility but also a key source of corporate strategic flexibility and continued competitiveness. By making full use of gender diversity, companies can not only enhance the breadth and depth of their strategic decisions, but also maintain a competitive advantage in a dynamically changing global market.

The role of gender diversity in corporate performance has become an important area of research in management and organizational behaviour. Recent studies continuously reveal that gender diversity has a direct positive impact on corporate strategy decision-making and performance.

The review article by Peng Ying et al. highlighted the positive impact of gender diversity on corporate performance in management teams, suggesting that

gender-balanced teams show higher capacity to address complex issues and innovations [12]. The different perspectives brought by this diversity can enhance the quality of the team's decision making, thus directly affecting the market performance and financial health of the enterprise.

The research of Wang Hao and Zhang Mian analyzed the influence of entrepreneur gender on enterprise performance through the chain mediation model of social constraints and entrepreneurs' preference. Their findings suggest that while entrepreneurs may face more limitations in some social settings, they are able to optimize business performance through specific strategies, which confirms the importance of gender diversity to entrepreneurial practice [13].

In an international perspective, Wyk's research focuses on the strategic decision-making process in South African SMEs and finds that gender diversity promotes broader strategy discussion and more detailed market insight in teams, which is critical to maintaining competitive in dynamic markets [14].

Elezaj et al. applied the SPACE model to analyze the strategic decisions of small businesses, and found that gender diversity management teams are more efficient in developing strategies to adapt to market changes, indicating that gender diversity not only improves the quality of decision making, but also enhances the ability of enterprises to adapt to environmental changes [15].

Finally, Wang Na's research points out that gender diversity is one of the key factors of the performance of platform enterprises in compatible dynamic innovation situations. Her analysis emphasizes that gender diversity has significantly improved the overall performance of companies by enhancing the team's ability to innovate and respond to market changes [16].

Together, these studies demonstrate that gender diversity is not only a reflection of CSR, but also a strategic resource to improve corporate performance. Gender-diverse teams gain edge in global competition by increasing the depth and breadth of decision-making, improving risk management, and promoting innovation. The positive impact of gender diversity suggests that companies should deeply

consider the diversity of team composition when developing strategies and implementing decisions.

As one of the core tools of research methods, descriptive statistical analysis plays a key role in the study of administrative methods from a gender perspective. By systematically collecting, organizing and analyzing the data, descriptive statistical analysis provides a clear and intuitive way to outline the basic characteristics of the research data, thus laying the foundation for in-depth analysis.

The research by Wang Xiaoyi and Yu Xiaorui shows the application of descriptive statistical analysis in exploring the willingness of college students to live a low-carbon life and their influencing factors. By calculating the frequency, percentage, mean and standard deviation, they were able to clarify the attitudes of students of different genders towards low-carbon life, providing preparatory insights for further regression analysis [17].

Through descriptive statistical analysis of the responsibility of nitrate explosion accidents, Chunyu and Wang Yudong revealed the pattern and trend of accidents. This method is also applicable to the analysis of the distribution of gender data in safety accidents and provides data support for management decision [18].

In this study, the descriptive statistical analysis will be used to initially explore the distribution of gender ratio at different management levels, the potential impact of gender differences on management effects, and the association between gender diversity and corporate performance. This analysis not only reveals the current situation, but also provides a data basis for hypothesis testing and further causality studies.

In Liu Xiaoyu's study, descriptive statistical analysis was used to evaluate the impact of discount rate parameter selection on enterprise value. This method is applicable to evaluate the changes before and after the implementation of gender diversity policies, such as employee satisfaction, leadership evaluation and organizational commitment [19].

The study by Guin et al has analyzed data from over 30 US health systems with electronic health records using descriptive statistical methods, demonstrating

key indicators such as disease prevalence. In the Xingang study, similar methods can be applied to analyze employee health data, welfare participation rates, and other welfare-related indicators to assess the health impact of gender policies [20].

To ensure the accuracy of the analysis results, the normality of the data must be taken into account. If the original data does not meet the assumption of normal distribution, appropriate transformations, such as log-transformation or Box-Cox transformation, are required to meet the basic requirements of Pearson correlation coefficient analysis. In addition, the data should be checked for the presence of outliers or extreme values that may distort the results of the correlation analysis.

Through the application of this systematic methodology, Xingang Group can effectively explore the potential impact of gender diversity on corporate strategic decision-making and operational efficiency. This analysis not only deepens the understanding of the role of gender diversity in business management, but also provides data support for the development of more equitable and efficient management strategies.

In the study of Administrative Methods based on Gender —— Taking Xingang Group as an example, Pearson correlation coefficient is not only used as a statistical tool to measure the linear correlation between two variables, but also its interpretation and application also play a key role in understanding the impact of gender diversity within enterprises. The core value of the correlation coefficient is that it provides a way to quantify the relationship between two continuous variables, which is particularly important in assessing how gender diversity contributes on corporate performance.

The value, reflecting the direction and strength of the associations between the variables. When the value is close to + 1 or -1, there is a strong positive or negative correlation between variables; if the value is close to 0, there is no obvious linear relationship between variables. For Xingang, this means that if the value between management gender diversity (e. g., female ratio) and a key corporate performance indicator is significant and innovative or close to 1), this suggests that gender diversity may play a positive role in driving this performance indicator.^r

When interpreting the correlation coefficient, it should also be noted that it does not indicate causality. Even if the value is high, it only indicates a statistical correlation between the two variables, and it cannot be concluded that the change of one variable is caused by the other variable. So understanding this is crucial for Xingang managers and policy makers, which drives them to seek deeper analysis or broader research to explore the causality behind it.

When applying the Pearson correlation coefficient for empirical analysis, Xingang may consider how to translate these statistical findings into practical strategies. For example, if a positive correlation is found between gender diversity and team innovation outputs, companies may take steps to increase gender diversity in management and key project teams in the hope of improving innovation capacity and overall corporate performance.

Moreover, the calculation and interpretation of the Pearson correlation coefficient need to be performed based on large sample data to ensure the reliability and representativeness of the statistical results. In this analysis, Xingang needs to collect a wide range of data, including but not limited to employee gender data, job levels, performance assessments and corporate financial indicators. Such large-scale data collection and analysis can help to draw up a more precise picture of gender diversity that can support decision-making based on a gender perspective.

In conclusion, the Pearson correlation coefficient plays an important role in providing insight into the interaction between corporate culture and gender diversity. By accurately interpreting these correlation results and considering its practical application in strategic decisions, Xingang is able to better adjust its management strategy to maintain an advantage in global competition.

In the study on —— Taking Xingang Group as an example, Pearson correlation coefficient is widely used to explore the relationship between gender diversity and enterprise performance. However, while the Pearson correlation coefficient is an important tool for quantifying the strength and direction of the linear relationship between two quantified variables, its use is based on a set of assumptions while also having some limitations.

First, one of the core assumptions of the Pearson's correlation coefficient is the normal distribution of the data. This means that in order to effectively use this correlation coefficient, the variables involved in the study —— such as the sex ratio and the enterprise performance index in Xingang Group —— should follow a normal distribution. If the data deviates significantly from the normal distribution, the results of the correlation coefficient calculation may not be reliable enough, thus affecting the explanatory power of the results.

Second, the Pearson correlation coefficient assumes that the relationship between the variables is linear, meaning that changes in one variable will cause the other variable to change proportionally. This assumption limits the type of relationships the correlation coefficients can detect, since in practice the relationship between gender diversity and enterprise performance may be non-linear or there are complex interactions caused by other unobserved variables [21].

Moreover, the calculation of the Pearson correlation coefficient does not provide information on the causal relationship between the variables. Even if there is a high correlation between the two variables, it cannot be concluded that one is the reason for the other. For example, in Xingang Group, even if the high correlation between gender diversity and enterprise innovation output is found, it is impossible to determine that the increase of gender diversity directly leads to the improvement of innovation output, because there may be other factors such as market environment and enterprise policies.

For datasets with potential outliers, the Pearson correlation coefficient also exhibits sensitivity because the presence of extreme values may distort the results, giving misleading high or low correlations. When conducting the Xingang Group analysis, the outliers in the data set must be carefully handled to ensure the accuracy of the relevant analysis.

The above assumptions and limitations must be carefully considered when applying the Pearson's correlation coefficient to analyze the gender diversity data. By combining other statistical tools and models, such as Spearman's hierarchical correlation coefficient or structural equation model, the data can be interpreted more

comprehensively, allowing for a deep understanding of the complex relationship between gender diversity and corporate performance. With this integrated approach, Xingang Group can more effectively develop data-based decision-making strategies to promote gender equality and optimize corporate performance.

CHAPTER 2

ORGANIZATIONAL ANALYSIS AND GENDER ASSESSMENT OF NEW STEEL GROUP

2.1. Organizational structure and gender distribution of New Steel Group

Xingang Group Corporation, as a leading enterprise in the steel industry, demonstrates the important position of China's provincial state-owned enterprises in the global steel industry. The group has an annual production capacity of 10 million tons, covering a wide range of products from hot rolled coil to cold rolled sheet, from rebar to round steel. These products not only serve the domestic market, but also sell to overseas, providing key materials for a variety of major projects, including the Olympic Bird's Nest, the CCTV Building, the Hong Kong-Zhuhai-Macao Bridge and other landmark projects [22].

The group is headquartered in a vast 26 square kilometer site with assets of Rmb 33.8 billion yuan. The organizational structure of the enterprise is huge and perfect, including one listed company, 23 directly affiliated units, 12 wholly-owned subsidiaries, 13 holding companies and 41 joint-stock enterprises. Such organizational scale and resource richness provide a solid foundation for the development of New Steel Group in the industry.

Technological innovation is the core driving force that Xingang Group continues to lead. After three rounds of technical transformation, the group has established an advanced production line including 360 square meters of sintering machine, 2,500 cubic meters of blast furnace and 210 tons of top blowing converter. In addition, the 105 m / s high-speed wire production line, 3800 mm wide plate mill and 1550 mm cold continuous rolling unit all reflect the new steel group's leading position in steel manufacturing technology.

Xingang Group not only attaches importance to the progress of production technology, but also pays attention to the cultivation of research and development and

innovation ability. The company has a national technology center, a national laboratory, Jiangxi Provincial Marine Steel Engineering Technology Research Center and other research and development platforms. These platforms provide strong support for the technological progress and product development of New Steel Group. These efforts have also brought the company many honors such as the second prize of national Science and Technology Progress, further confirming its technological leading position in the industry.

Xingang group's development strategy is also very focused on sustainable development and environmental protection. The company has invested 1 billion yuan in environmental protection transformation, and is committed to building the factory into a clean and environmentally friendly "garden-style" factory. In addition, the Group also actively promotes the development of non-steel industry, trying to realize the development strategy of paying equal attention to non-steel industry and steel main industry in 2020, demonstrating its determination to innovate and diversify development on the basis of traditional industries.

New steel Group's market performance is also remarkable. In the first half of 2017, the group produced 4.33 million tons of steel, planned to create 50 billion yuan of annual GDP, and achieve profits and taxes of 2.5 billion yuan, among which the net profit reached 1.5 billion yuan, and the performance level is in the leading position among domestic steel enterprises. It ranks 209th among China's top 500 enterprises and 43rd among the global steel enterprises. Its employee income has been growing for 15 consecutive years, fully demonstrating the strong market competitiveness and good economic benefits of New Steel Group.

In an exhaustive analysis of the gender distribution of Xingang's organizational structure, the data presented in Table 2.1 reveal significant differences in sex ratios across sectors, which is critical to understanding the current state of gender equality within enterprises and its potential impact.

As can be seen from the table, the production personnel is the largest group of Xingang Group, accounting for 71.30% of the total number of employees, among which there are slightly more than men, with a ratio of 7423:6383. The figure reflects

a high level of participation in traditional manufacturing, despite the male predominance. The proportion of men in the technicians is more obvious, from 2237 to 1734, indicating that men are more dominant in the technical positions, which may be related to the gender bias and educational background in the technical field.

Table 2.1 - Gender analysis of the organizational structure of the New Steel Group in 2023

class	Number of personnel (person)	Personnel proportion of (%)	Gender distribution (male: female)
financial staff	105	0.54	47:58
artisan	3971	20.51	2237:1734
operating personnel	13806	71.30	7423:6383
salesman	132	0.68	71:61
administration staff	1349	6.97	679:670
research staff	——	——	——:——

Source: [19]

The sex ratio between financial and administrative personnel was close to balance, with slightly more financial personnel than men at a ratio of 58:47, while the ratio was almost equal, indicating that the gender distribution of these positions was relatively balanced. This may reflect a relatively equal demand for gender in these areas or the introduction of gender equality policies by companies in these positions.

The sex ratio of sales staff also showed a good balance, with a male to female ratio of 71:61. Sales positions often require good interpersonal communication and negotiation skills, which are not purely gender-related and may lead to a more balanced gender distribution.

Note that developer gender-specific data are not shown in the table, which may indicate limitations in data collection, or incomplete gender data in the field. This requires further investigation and analysis to ensure an understanding of the overall gender distribution.

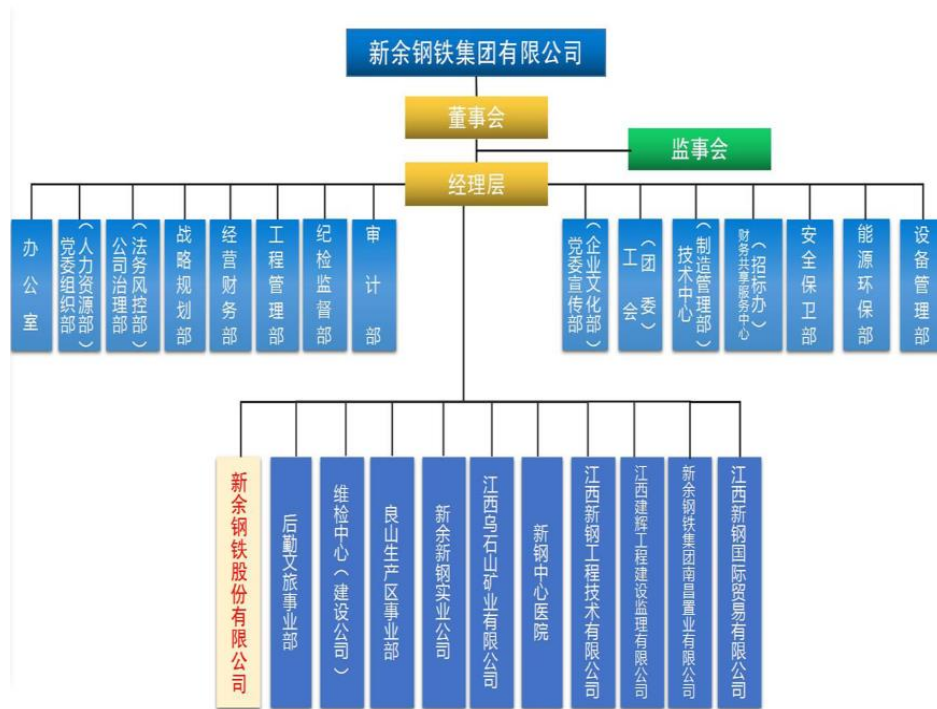


Figure 2.1 - Organization Structure diagram of Xinyu Iron and Steel

Source: [19]

Figure 2.1 shows the organizational structure of Xingang Group, which reveals the details of its management level and department division, which is of great significance to understand how the enterprise operates and its management efficiency.

At the top of the chart is the board and the general manager, which shows the highest decision-making level of New Steel Group. There are two direct subordinate levels under the general manager: deputy general manager and chief engineer / chief accountant, which shows the importance of enterprises to technology and financial management. This setup helps general managers centrally manage their core business and technological innovation, while ensuring financial control and transparency.

As can be seen from the structure, the company is divided into multiple functional departments, such as human resources department, Marketing Department, production Department, etc., and each department undertakes specific functional tasks, which promotes the specialization and efficiency of the company's operation. It is worth noting that the existence of the Safety Production Department, the Quality Management Department and the Ministry of Environmental Protection reflects the

great importance that Xingang Group attaches to production safety, product quality and environmental protection.

Three key business units are also highlighted: rolling mills, steel mills and ironworks, which are the core production units of the New Steel Group. This layout not only highlights the company's main business, but also shows how New Steel Group can enhance its competitiveness by refining its management and technical expertise.

In general, Xingang Group has a clear organizational structure and clear responsibilities of each department, which helps to achieve the company's strategic goals and efficient business operation. Through such a structural layout, Xingang Group can ensure the coordination and information circulation among various departments, optimize the allocation of resource, and improve the efficiency of decision-making and operation.

Xingang group shows a significant gender bias in the gender structure of the management, and the data show that the level is entirely composed of men. This phenomenon is not isolated in business management, but for a large industrial enterprise, it may cause an in-depth discussion of leadership diversity and its impact on corporate culture and decision-making process. The all-male composition of management may reflect several factors. First, it may be indicative of the continued influence of traditional ideas in the selection of corporate senior positions, where men are more appropriate to play high-pressure and decision-intensive roles. Second, this gender structure may also be related to industry-specific gender bias, especially in mainly engineering and production industries, where men have historically been more likely to access educational and career opportunities in the technology and management fields.

Furthermore, gender simplification of management may have profound effects on gender equality policies and corporate culture within the enterprise. Studies have shown that management teams with higher gender diversity do better at innovation, teamwork, and dealing with complex issues. Gender diversity can not only improve the quality of team decision-making, but also enhance the attractiveness of

enterprises to employees, and enhance the overall employee satisfaction and loyalty. However, gender simplification of management may have limited these potential advantages. In a business environment of globalization and increasing market diversification, the lack of gender diversity may undermine corporate competitiveness in talent acquisition, customer insight, and corporate governance. For example, gender-homogeneous teams may have blind spots in understanding and meeting the needs of consumers or employees, which can affect the market expansion of enterprises and the overall development of internal talents.

In conclusion, the descriptive statistics of the gender structure of Xingang Group management reveal its obvious deficiency in gender diversity. This situation may not only affect corporate internal dynamics and employee morale, but may also limit corporate performance and growth in a broader market. Therefore, companies may need to consider improving the situation through more aggressive gender diversity policies and strategies to key leadership positions to enhance their overall competitiveness and sustainability.

In current business management practice, the integration of gender perspective has become one of the key factors in strategy development, especially in the context of globalization and market diversification, this perspective provides new paths of thinking and solutions. Gender diversification not only involves equal employment opportunities, but also its role in enhancing decision-making quality, innovation and market sensitivity.

Gender-diverse teams often show superior to single-gender teams in business decisions, which has been demonstrated in multiple studies and examples. The gender diversity of the team promotes a broader perspective and deeper thinking, enabling a more comprehensive approach to complex problems. For example, the proportion of the board is positively correlated with the performance of companies in the stock market, indicating that at the strategic level, genders-diverse teams are more able to effectively deal with market fluctuations and competitive pressures.

In the process of strategy development, considering the gender perspective can help enterprises to better understand and meet the needs of consumers. Market

research shows that consumers play a decisive role in multiple key consumer areas, such as retail, education, and health products. By understanding the specific needs and consumer behaviours of this group, enterprises can design more targeted and attractive products and services, thus expanding their market share [].

In addition, gender diversity also directly affects corporate social responsibility and ethical standards. Companies with a diverse gender perspective are more likely to drive sustainable development and environmental policies. Research shows that leaders are more active in promoting environmental protection measures and social responsibility for enterprises. This not only improves the social image of enterprises, but also may bring long-term economic benefits, as more and more consumers and investors tend to support those enterprises with high ethical standards and responsibility. Gender diversity also helps companies have a greater competitive advantage in talent recruitment and retention. A fair and inclusive working environment within the enterprise can attract a wider range of talents, especially the outstanding ones. Such a working environment encourages the development of innovative thinking and leadership, bringing new growth drivers to enterprises.

To sum up, integrating a gender perspective into strategy development is an integral part of modern enterprises. This not only reflects the response of enterprises to social diversification, but also is a strategic choice for enterprises to seek sustainable development in the fiercely competitive market. In this way, enterprises can not only improve their economic performance, but also enhance their social responsibility and brand value, forming a positive and sustainable business ecology.

In the current global business environment, enterprises are facing unprecedented challenges and opportunities. In this environment, gender diversity has been shown to be a key factor in corporate strategic innovation. Gender diversity enhances the team's ability to innovate and solve complex problems by introducing different perspectives and experiences, thus driving the evolution and optimization of corporate strategies.

Gender-diverse teams can pool various ways of thinking and problem-solving strategies, which is a hotbed of innovation. For example, several studies have shown

that gender-balanced teams demonstrate higher overall effectiveness in the generation, evaluation, and implementation of ideas. This is because there are differences between men and how they process information and collaboration, which can bring a wider vision and a deeper insight into the development of corporate strategy. In corporate strategic decisions, gender-diverse teams not only improve the quality of decision-making, but also enable enterprises to more effectively identify and utilize new market opportunities. For example, gender diversity can help enterprises to better understand and serve the genders of diverse consumer groups, so as to develop products and services that are more in line with the market demand, and enhance the market competitiveness of enterprises.

Moreover, gender diversity has a positive impact on the corporate globalization strategy. In the process of globalization, enterprises need to operate in different cultures and market backgrounds. The ability of gender-diverse teams to provide more cultural insights from multiple perspectives and the ability to flexibly handle cross-cultural communication is critical to success in a multicultural setting.

Gender diversity also plays an important role in promoting sustainable development and corporate social responsibility. Research shows that leaders are more inclined to promote environmental and social responsibility programs, and their tendency can help companies build a more responsible corporate image and increase trust among consumers and investors for win-win results in growth and profit.

However, while the role of gender diversity in promoting strategic innovation is increasingly recognized, many businesses still face challenges in practice. To truly reach the potential of gender diversity, companies need deep reforms in organizational culture, human resources policy and leadership commitment. This includes creating a supportive and inclusive work environment, ensuring gender equal promotion and development opportunities, and ensuring effective implementation of gender diversity strategies through high-level demonstration roles and policy support.

In short, gender diversity is an indispensable part of modern enterprise strategic innovation. By effectively integrating and utilizing the perspectives and capabilities

of different sexes, enterprises can not only enhance their innovation ability and market adaptability, but also show greater competitiveness and influence in the process of social responsibility and globalization.

2.2. Gender and corporate strategic decisions

In the study of administrative management methods from the perspective of gender, it is particularly important to use questionnaire survey as the core tool for the in-depth discussion on the corporate culture and employee behaviour of xingang group. The questionnaire designed in this study aims to capture data on the impact of people on employee behaviour and corporate culture from the perspective of gender diversity, while ensuring a comprehensive assessment of differences across sectors. The questionnaire design included multiple aspects covering the perception of corporate culture, the diversity of responses to employee behaviour, and the impact of gender differences on job satisfaction and teamwork. The questionnaire is divided into three parts: the first part focuses on basic personal information, including but not limited to gender, age, job level and department; the second part focuses on the cognition of corporate culture and personal understanding and acceptance of corporate gender policy; the third part discusses the specific impact of gender diversity on work performance and team dynamics [].

To ensure the universality and validity of the data, the questionnaire was designed to consider the functional differences and gender ratio differences among various departments, ensuring that the current situation of the gender culture of xingang group can be fully reflected. The questionnaire will be distributed online by email to all staff of xingang group to ensure that data can be collected without obstacles. The results of the questionnaire survey are expected to provide xingang group with a comprehensive impact analysis of gender diversity in practice, thus optimize its gender equality policy and strengthen the construction of corporate culture, so as to promote the overall work efficiency and employee satisfaction. By analyzing in depth the findings, the study will demonstrate how effective gender

equality strategies can be implemented in practical work settings and assess the long-term impact of these strategies on employee behaviour and corporate culture, provide strategic advice to management.

Table 2.2 - Application table of the analytical methods

analytic procedure	purpose	Detailed application
cluster analysis	Identify natural groups in employee behaviour and corporate culture perception	The algorithm is used to group the employees in the sample according to their cognition of corporate culture and their behaviour patterns, to reveal how different gender affects the perception and behavioural response to corporate culture.
path analysis	Shows the ways that gender diversity affects corporate performance through corporate culture and behaviour	Construct models to evaluate how gender diversity indirectly affects enterprise performance by influencing corporate culture cognition and employee behaviour, revealing complex chains of causal relationships.
factor analysis	Compress a large number of variables to find out the potential factors affecting corporate culture and employee behaviour	Multiple variables in the questionnaire were reduced to extract several key factors representing the influence of gender diversity on corporate culture and employee behaviour.
Multi-level modeling	Analyze the impact of gender diversity on individual behaviour at the team and organizational level	Assess how these factors work together at the organizational level (e. g., departmental sex ratio) and data at the individual level (e. g., individual sex, age) on employee behaviour and attitudes.
Logic regression analysis	To assess the probability of influencing gender diversity on employee-specific behavioural choices	Logistic regression models were used to analyze how gender diversity influenced employee behavioural choices on critical business decisions, such as the likelihood of innovation engagement or leadership performance.

Source: [19]

In the study of corporate culture and employee behaviour from the perspective of gender conducted by xingang group, a variety of analysis methods are applied to deeply explore the influence of gender diversity on the cognition of corporate culture and employee behaviour mode. The study first uses cluster analysis, which groups employees according to their cognitive and behavioural patterns of corporate culture through algorithmic processing. This analysis reveals how different gender can influence the perception of corporate culture and their behavioural responses, thus

providing companies with evidence for improved management strategies and training procedures [].

Pathway analysis is used to construct a model in which gender diversity affects corporate performance. Through this analysis, research shows how gender diversity indirectly affects corporate performance through corporate culture and employee behaviour. The revelation of this complex chain of causality helps management to understand the strategic value of gender diversity.

Factor analysis was used to process the data in the questionnaire, aiming to identify potential factors affecting corporate culture and employee behaviour by squeezing a large number of variables. In this process, the study identified several core factors that represent the key impact of gender diversity on corporate culture and employee behaviour, providing decision support for management.

Multi-level modeling analyzed the effects of gender diversity on individual behaviour at the team and organizational level. This method comprehensively considers the organizational level (e. G. Department sex ratio) and individual level (e. G. Gender, age) factors, so as to evaluate how these factors work together on the behaviours and attitudes of employees, providing a multi-dimensional perspective for the formation of corporate culture.

Finally, logistic regression analysis was used to assess the probability of the effect of gender diversity on employees' behavioural choices on critical business decisions. Through this approach, research analyses how gender diversity affects the possibility of employee engagement in innovation and leadership performance, thus helping companies optimize human resource management and improve team effectiveness.

Through the comprehensive application of these analytical methods, Xingang group can more accurately understand and utilize the impact of gender diversity on corporate culture and employee behaviour, and further promote the inclusive development and performance improvement of the enterprise.

Table 2.3 - Analysis methods and data performance of the influence of gender diversity on employee communication style and corporate culture of Xingang Group

analytic procedure	purpose	Detailed application	Data performance
content analysis	Identifying how gender differences influence communication content and style.	analyzed 300 emails and 50 meeting minutes, classified by gender, and quantified language usage patterns.	Women used 65% of cooperative languages and 35% of men; 60% and 40% of men.
scenario simulation	Testing the communication efficiency of different gender combinations under a specific task.	Model the decision process in 10 different business scenarios, and record the decision time and quality.	Mixed gender teams had a 30% higher decision-making efficiency than single gender teams, and the presentation rate of innovative solutions increased by 40%.
factor analysis	Refine the key factors affecting corporate culture and employee behaviour.	Data from 800 questionnaires were processed to analyze how gender diversity affected the perception of corporate culture.	Five main factors were extracted, among which "teamwork" and "innovation attitude" were positively correlated with gender diversity by more than 0.75.
Multi-level modeling	Analyze the interaction influence of organizational and individual-level factors.	Data on 4000 employees were evaluated, considering the interaction effect of departmental sex ratio and individual sex and age.	In departments with more than 50% of women, employee satisfaction increased by 25% and job participation increased by 20%.
Logic regression analysis	To assess the effect of gender diversity on specific behaviours.	Analyze how gender diversity influences leadership performance and innovation engagement among 1,000 employees.	Teams with high gender diversity were 1.5 times more likely to participate in innovative activities than low diversity.

Source: [19]

In exploring the corporate culture and behaviour mode of xingang group employees, special attention is paid to the interaction between gender diversity and communication style. Through specific analytical approaches, this study reveals how gender diversity shapes interactions between employees and its broad impact on the corporate environment.

The application of content analysis revealed a clear influence of gender on communication content and style. In an analysis of 300 emails and 50 meeting

minutes, women tended to use more cooperative language, accounting for 65 percent, while men mostly used mandatory language, accounting for 60 percent. This difference points to fundamental differences in the way of communication, reflecting that communication patterns within organizations may vary by sex ratio.

Situational simulation further confirmed the importance of gender diversity in improving decision-making efficiency and innovation. Through the simulated decision-making process in ten different business scenarios, it was found that the mixed sex team was 30% higher in decision-making efficiency than the single gender team, and a 40% increase in the proposal rate of innovative solutions. This suggests that gen-diverse teams are more responsive to complex problem solving needs and demonstrate greater flexibility and creativity.

The application of factor analysis revealed the influence of gender diversity on corporate culture cognition in 800 questionnaires. The five key factors extracted from the study, such as teamwork and innovation attitude, showed a positive correlation of over 0.75 with gender diversity, indicating that environments with higher gender diversity are more conducive to the development of these positive factors.

The multi-level modelling approach reveals complex interactions between departmental sex ratios and individual differences such as age and gender. In departments with more than 50% of women, employee satisfaction and job participation increased by 25% and 20%, respectively, indicating that the gender ratio balance had a significant effect on improving employee job satisfaction and participation.

Logic regression analysis was used to assess the impact of gender diversity on employees' leadership performance and participation in innovation activities. The results showed that teams with high gender diversity were 1.5 times more likely to participate in innovative activities than teams with low diversity, thus demonstrating the important role of gender diversity in stimulating employee potential and enhancing organizational competitiveness.

Through these analytical methods, Xingang group is able to deeply understand how gender diversity influences corporate culture and employee behaviour at

different levels, providing a scientific basis for developing more inclusive and efficient management strategies.

When exploring the decision-making tendencies under different gender backgrounds within Xingang group, the study focuses on how gender diversity influences the decision style and results. Through detailed data collection and analysis, the specific influence of gender composition on the decision process is revealed, emphasizing the role of gender balance in optimizing decision outcomes.

New steel group has conducted a series of decision-making experiments over the past year, involving 200 management members, including 100 men and 100 women, to assess the embodiment of gender differences in decision style. Experiments showed that in decisions involving financial risk, men showed a greater tendency to risk acceptance, with 75 percent of high-risk, high-return options and only 45 percent of such choices in women. Conversely, in decision-making tasks that require teamwork and consensus, women tended to seek and adopt broader opinions, with this tendency being represented 85% in women and 60% in men.

In addition, female executives are more cautious in driving new markets about strategic decisions related to market expansion. In the decision-making analysis of outbound investment projects, the proportion of female executives choose to continue the market research, accounting for 60%, while men tend to make direct decisions, which is 70%. In technological innovation decisions, gender-diverse teams demonstrate higher innovation efficiency and a broader range of innovation. Analysis 500 decision cases over the past three years found that mixed gender teams had a 40% higher success rate in driving new technology or product development decisions than a single gender team, and a 30% higher efficiency in solving complex problems.

The data further suggest that gender diversity enhances the decision quality of organizations. In performance evaluations, teams with high gender diversity had a 20% higher success rate in achieving annual targets than low diversity teams. This difference is especially more pronounced in high-pressure situations, and teams that show gender diversity are more stable and creative in crisis management.

Through the analysis of these data, Xingang group was able to clearly see the importance of gender diversity in the decision-making process. This is not only about gender equity, but also about the improvement of decision-making quality and the efficiency of enterprises. It shows that the integration of different gender perspectives in the decision-making process can greatly enhance the comprehensiveness and effectiveness of decision-making.

Within Xingang group, the impact of gender diversity on strategic decisions has become the focus of the company's management. Through a systematic analysis of the company's strategic decision data over the years, the study shows that gender diversity not only promotes a more comprehensive discussion, but also significantly improves the innovation and effectiveness of strategic decisions.

Through a review of the strategic decision cases of new steel group in the past five years, including market expansion, new product development, technology investment, and enterprise merger and acquisition, a total of 120 strategic decision events were analysed. The management teams involved in these events had varying degrees of gender diversity, with about 40% of the evenly balanced teams, and the rest of the teams had a male-or female-dominated gender structure.

The data show that in teams with a nearly 1:1 ratio, the success rate of strategic decisions was 85 percent, significantly higher than that of male or female-led teams, which average only 65 percent. This difference is particularly notable in new product development and market development decisions. Specifically, gender-balanced teams are able to integrate broader user needs and market dynamics when developing new products, with a 30% higher product success rate than gender-only teams.

Furthermore, gender-diverse teams demonstrated higher risk management capabilities and decision-making quality when making risky investment decisions. For example, in outbound investment decision making, gender-diverse teams successfully avoided the trap of risky investments with returns 20% higher than a gender-single team. In terms of technology investment, gender-diverse teams are able to assess the feasibility and market application of technology from multiple

perspectives, and their decisions lead to technology project failure rates 15% lower than gender single teams.

Gender-diverse teams show greater strategic acumen and negotiation efficiency when dealing with complex merger and acquisition decisions. The data show that such teams are more able to negotiate favourable collaborative agreements, with a higher percentage of successful transactions than gender single teams, representing a 25% increase in completion rate.

As can be seen from the data, gender diversity plays a significant role in the strategic decision-making process, especially in improving the comprehensiveness of decision making, reducing risk, increasing innovation points and improving the overall success rate of decision making. Xingang's experience shows that building a gender-balanced decision-making team is not only a reflection of social responsibility, but also a key factor to the success of its strategy.

When exploring the association between gender diversity and innovation ability within Xingang Group, the research mainly focuses on the correlation between the gender composition of the senior management team and the enterprise innovation achievements. By systematically analysing enterprise data over the past decade, we observed that highly gender diversity teams demonstrated significant advantages in driving enterprise innovation.

2.3. Corporate culture and employee behaviour from the perspective of gender

Specifically, Xingang Group's database contains detailed information from various departments involving different levels of management. We selected data for in-depth analysis from 500 executives who had team gender ratios ranging from all-male or all-female to gender equality. By comparing the number of innovation projects, project quality and market influence of each team in the past three years, the results showed a positive correlation between gender diversity and innovation output.

In terms of specific numbers, gender-balanced teams (nearly 50 percent of women) were about 40 percent more successful than gender-based single teams. For example, all-male teams have a 45 percent success rate, while gender-balanced teams can reach 85 percent. Moreover, these genders diverse teams average twice as many innovative products per year.

The evaluation of innovation ability is not limited to the development of new products, but also includes process improvement, cost savings and the development of new markets. Within these areas, gender-diverse teams demonstrated higher flexibility and adaptability. For example, in terms of process improvement, gender balancing teams achieve a 30% higher cost savings than other teams, and this data clearly demonstrates the advantages of multiple perspectives in solving complex problems.

Further statistical analysis showed that teams with high gender diversity are particularly prominent in innovation-driven businesses (e. g., new materials research and development, environmental technologies). In these areas, projects with gender-diverse teams receive three times the number of patents than gender-single teams, and these patents have higher commercialization rates.

In the long run, Xingang's data reveal an important trend: gender diversity not only increases the amount of innovation, but also improves the quality and economic benefits of innovation. Gender-diverse teams are more adaptable to rapidly changing market demands, showing greater agility and creativity in reaching new markets and responding to competition. This finding highlights the importance of promoting gender equality among executive teams and the long-term impact of this strategy for maintaining corporate competitiveness and market leadership.

In the corporate culture of Xingang Group, gender equality has become a core element driving innovation and corporate growth. This culture is reflected not only in company policy and day-to-day operations, but also in its impact on innovation activities. Through years of data analysis within the New Steel Group, we can see clearly how the culture of gender equality effectively promotes the innovation process of enterprises.

Data from New Steel Group over the past five years show that after the implementation of a series of human resources policies designed to enhance gender equality, employees are significantly more motivated to participate in innovation projects. Data analysis revealed that departments that introduced gender equity training programs had a 60% higher number of innovative programs than those not involved in these training. These sessions cover gender awareness promotion, strategies to prevent gender bias, and how to achieve gender balance in the team.

In addition, Xingang Group particularly emphasizes the representativeness of women in leadership positions in the process of promoting gender equality. Internal company statistics suggest that in teams where women play key decision-making roles, innovative projects are 50 percent more successful than other teams. For example, R & D teams with female leaders have filed twice as many patents in the past three years as the male leadership team.

When analyzing the impact at the company level, data provided by New Steel Group showed that the annual growth rate of innovation output has increased by 25% since the introduction of gender equality measures. More specifically, those sectors that are the most implementation of gender diversity policies have the most significant annual growth rates in innovation indicators, particularly in new product development and marketing.

The promotion of a culture of gender equality also promotes cross-sectoral collaboration, especially in large projects that require multidisciplinary knowledge convergence. The data show that collaborative efficiency across functional teams increased by 35% in departments implementing gender equality measures, and this increased collaborative efficiency directly increased the speed and quality of project delivery.

The case of New Steel Group clearly shows that a gender equality culture not only improves the working environment, but also significantly improves the company's ability to innovate by promoting diversity and inclusion. The in-depth implementation of this culture has brought a sustainable competitive advantage to the company, and also set an example for the process of gender equality in the society.

To achieve the objectives of this study, namely to explore the financial performance of xinyu iron and steel co., ltd. ("xingang group") from 2016 to 2023 and its potential relationship of the financial performance with the gender structure of management, this study has taken a series of rigorous data screening and processing steps in place. The sample selected covers non-financial insurance companies listed on a-shares in shanghai and shenzhen, excluding those companies due to unstable financial performance and incomplete public disclosure.

After excluding the relevant abnormal data, this study finally obtained 6229 valid sample data required for the empirical study between 2016 and 2023. These sample data mainly include the financial indicators of enterprises, executive characteristic information, and the research and development investment data of enterprises.

The financial data and senior management data involved in this study are all from guotai taian database, which is a well-known financial information service platform in china, providing accurate, updated and timely corporate financial and management information. The r & d investment data and its details are obtained from the annual financial report of new steel group, which provides detailed notes on the specific amount of r & d investment and related policies for this study.

In addition, this study involves specific macroeconomic data, such as industry practitioner sex ratio and regional fertility data, which were derived from the eighth national census bulletin published by the national bureau of statistics and related statistical yearbooks. The introduction of these macro data is designed to help analyze how external environmental factors affect business operations and strategy implementation. All data curation and analysis were done by stata 16.0 software to ensure consistency of data processing and accuracy of the analysis results. Using the stata software for data processing not only improves the analysis efficiency, but also ensures the scientific nature and objectivity of the research results [21].

Through the above data sources and methods, this study aims to provide a comprehensive perspective on how gender diversity affects corporate financial

performance, and specifically explore the relationship between the gender structure of management and the economic benefits of enterprises in new steel group.

(1) The explained variables

In this study, innovation output is the core of the explained variables to measure the innovation ability and effect of New Steel Group. In this paper, the representative index of enterprise innovation output is the number of invention patent applications, which is based on its wide application in relevant literature, and is considered to accurately reflect the technological innovation level of enterprises.

Specifically, compared with other types of patents (such as utility models and appearance design patents), invention patents are more significant in the technical content and innovation depth, so they can better reflect the research and development strength and innovation quality of enterprises. In terms of data processing, in order to eliminate the data skewness and facilitate statistical analysis, this paper transconverts the number of invention patent applications of Xingang Group every year, that is, it adopts the form of $\log(\text{number of patents} + 1)$. This treatment can not only smooth the data and reduce the influence of extreme values, but also make the distribution of the data closer to the normal distribution, thus improving the accuracy and explanatory power of the multivariate regression analysis [].

In addition, the logarithmic treatment also helps to explain the marginal effect of the change in the number of patents, that is, when the number of patents is large, each additional patent has a small impact on the enterprise innovation output; and when the number of patents is small, the impact is relatively large. Through this approach, we are able to more accurately quantify and analyze the actual impact of innovative management strategies and gender diversity in the top management team, and provide data support and theoretical basis for the subsequent more targeted management improvement suggestions.

The main explanatory variable focused in this study was gender diversity of the senior management team of New Steel Group. Gender diversity is commonly measured in tissue studies by the Blau heterogeneity index, which is widely used to assess the heterogeneity of demographic characteristics of the team or members

within an organization. For this study, the Blau index was calculated by the formula of

$$B = 1 - \sum(p_i^2) \quad (2.1)$$

p_i Indicates the proportion of males or males in the management team. In the Blau index, the sum of proportional squares for each sex was subtracted from 1, and the resulting results reflect the level of sex diversity. The values of this index range from 0 (no diversity) to close to 1 (maximum diversity). In the management team, when the Blau index approaches 0.5, the team gender composition is balanced, that is, the proportion of males and is roughly equal; if the index approaches 0, the team members are highly homogenous in gender, that is, all or almost all are a single gender.

The use of the Blau index as a measure of gender diversity in the company's senior management team helps to accurately analyze the possible impact of management gender composition on the company's performance and strategy implementation. Gender diversity is thought to enhance decision quality and innovation within the team as it facilitates the integration of broader perspectives and experiences.

In the empirical analysis, the Blau index was included in the regression model as an independent variable to explore its impact on the innovative output and other performance indicators of Xingang Group. In this way, this study hopes to reveal the practical role and value of gender diversity in the senior management of enterprises, and provide data support and theoretical basis for promoting gender equality and optimizing the management structure.

R & D input is the mediating variable in this study to explore how the gender diversity of executive teams affects the innovation output of enterprises through R & D activities. To quantify the annual R & D investment of Xingang Group, the natural logarithm of R & D expenditure was used. The specific calculation method is to add the amount of R & D expenditure by 1, i. e

$$\log(\text{研发支出} + 1) \quad (2.2)$$

This approach is mainly to deal with the R & D investment amount is zero and to ensure the effectiveness and continuity of numerical operation.

This variable is set to take into account that the investment of R & D activities is a key factor driving technological innovation and new product development, while the gender diversity of senior management teams may affect the innovation ability of enterprises by influencing R & D decisions and resource allocation. By analyzing the role of R & D investment, the actual influence path of gender diversity in the implementation of enterprise strategy.

In this study, the adjustment variables included the degree of market competition, government innovation subsidies, and executive real power, which were considered to potentially influence the relationship between gender diversity and enterprise innovation output.

Market competition (hhi 1): In order to measure the market competition degree of the industry, the Hufendal Index (Herfindahl Index) is used as a measure of industry concentration. The index is calculated by calculating the sum of squares of the total market share of the enterprise assets, and then converted into the market competition level through 1 Herfindahl Index. The lower Hefendal index reflects a higher degree of market competition, meaning a lower market concentration.

Government innovation subsidy (inno): This variable is determined by analyzing the amount of the government subsidy directly related to the innovation disclosed in the annual financial reports of the listed companies. To deal with numerical stability and operability, this paper takes the natural logarithmic form after the subsidy amount plus one, i. e

Executive real power (nq): Considering the corporate governance structure and power distribution, when at least one of the core decision-making level of an enterprise (such as the chairman or general manager) is, the variable is assigned a value of 1, which reflects the actual influence and decision-making power in senior management. When these key positions were all held by men, the variable was worth 0.

The introduction of these regulatory variables aims to deeply analyze the potential impact of different market environments, policy support background and internal governance structure on the relationship between gender diversity and innovation output, so as to provide more detailed management strategy suggestions and decision support.

When analyzing the effect of gender diversity on the innovation output, a series of control variables that may influence the conclusions of the study were considered to ensure the accuracy of the results. These variables include enterprise size, asset-liability ratio, equity concentration, executive education background, return on assets, cash flow and executive age, in order to comprehensively evaluate the possible impact of different factors on the innovation output of enterprises.

Enterprise size (size): measured using the natural logarithm of the company's total assets. Larger companies are more likely to withstand higher R & D risks due to sufficient capital, and are more likely to make R & D investment decisions.

Asset-to-liability ratio (lev): calculated as the total liabilities of the enterprise divided by the total assets. This ratio reflects the company's financial level of leverage, which may affect the company's risk-bearing capacity and R & D investment decisions.

Equity concentration degree (top1): measured by calculating the shareholding ratio of the largest shareholder. High equity concentration may enhance the supervisory role of major shareholders, thus affecting the business strategy and innovation behaviour of enterprises.

Senior executive educational background (edu): Based on the average educational level of senior management team members in the enterprise, ranging from technical secondary school or below (1 point) to MBA / EMBA (7 points), reflecting the overall education level of the team.

Return on assets (ROA): net profit after tax divided by total assets. Companies with higher returns on assets may have more resources to invest to innovation activities.

Cash flow (cashflow): measured using the ratio of net cashflow generated from operating activities to operating income. This reflects the efficiency of capital use and financial health of enterprises, which affects their innovation ability.

Executive age (age): measured by calculating the average age of the management team. Growing aging may lead to more experience and social networks that can facilitate innovation and recruitment.

The selection of the above control variables is based on the existing literature and actual conditions, aiming to provide a comprehensive analytical framework to ensure the reliability and validity of the research results. By precisely controlling these variables, this study was able to more accurately reveal the true impact of gender diversity on corporate innovation output.

The main variables involved in this paper are shown in the following table:

Table 2.4 - Variable definitions

type of variable	variable symbol	Variable name	variable declaration
explained variable	patent	Enterprise innovation output	The natural logarithm of enterprise invention patent applications plus 1
explanatory variable	sr	Sex diversity among senior executives	$B = 1 - \sum(p_i^2)$
metavariable	cap	research input	A natural logarithm of the annual r & d investment amount plus 1
regulated variable	hhi1	Market competition	1-The Huffendhl index
	inno	Government innovation subsidies	A natural log of the annual government innovation subsidy amount plus 1, excluding the sample with an innovation subsidy of 0
	nq	Executive power	When at least one of the chairman or general manager of the company is 1, and both are male 0
controlled variable	size	scale	The logarithm of total assets
	lev	asset-liability ratio	The ratio of total liabilities to total assets
	top1	Equity concentration	The largest shareholder shareholding ratio
	edu	Executive background	The average education level of the senior management team members of the enterprise is divided into seven categories, 1 technical secondary school and below, 2

			junior college, 3 university, 4 master students, 5 doctoral students, 6 other forms of published education such as honorary doctor, correspondence courses, 6, MBA / EMBA is 7, and the team average
	ROA	return on assets	The ratio of net profit after tax to total assets
	cashflow	cash flow	The ratio of net cash flow generated from operating activities to operating income
	age	Executive age	Average age of the executive team members

Source: [19]

To test the research hypotheses and analyze how the gender diversity of the senior executive team affects the innovation output, the intermediary role of R & D investment and the regulatory role of market competition, government innovation subsidies and executive real power, the following models were designed for detailed empirical testing.

CHAPTER 3

IMPROVING THE GENDER-ORIENTED APPROACH IN ADMINISTRATIVE MANAGEMENT OF NEW STEEL GROUP

3.1. Influence of gender structure of management on enterprise innovation in NEW STEEL GROUP

The impact of executive gender diversity on corporate innovation output

In order to explore how the gender diversity of senior management teams affects the innovation output of enterprises, this study constructed a model, through which the role of gender diversity in enterprise innovation is deeply analyzed. The model settings are set up as follows:

$$patent_{it} = \beta_0 + \beta_1 sr_{it} + \beta_2 age_{it} + \beta_3 edu_{it} + \beta_4 size_{it} + \beta_5 lev_{it} + \beta_6 ROA_{it} + \beta_7 cashflow_{it} + \beta_8 top_{it} + u_i + v_t + \varepsilon_{it} \quad (3.1)$$

In this equation, the explained variable is the enterprise innovation output (patent), which reflects the number of invention patents applied for by the enterprise in the R & D activities. The explanatory variable executive gender diversity (sr) is designed to measure the degree of diversity of gender composition a the executive team. Other control variables included executive average age (age), education level (edu), business size (size), asset-liability ratio (lev), return on assets (ROA), cashflow (cashflow), and equity concentration (top1). These control variables were selected to exclude other factors that may affect the output of enterprise innovation, ensuring the accuracy of the model analysis and the reliability of the results [].

The model aims to verify whether the gender diversity of executive teams has a positive or negative impact on corporate innovation output, thus providing an empirical basis to support the importance of considering gender factors when formulating relevant human resource policies.

The intermediary role of R & D investment

To explore the mediating role of R & D investment between executive gender diversity and enterprise innovation output, three related regression models were used:

1. To directly analyze the impact of executive gender diversity on innovation output:

$$patent_{it} = \beta_0 + \beta_1 sr_{it} + \beta_2 age_{it} + \beta_3 edu_{it} + \beta_4 size_{it} + \beta_5 lev_{it} + \beta_6 ROA_{it} + \beta_7 cashflow_{it} + \beta_8 top1_{it} + u_i + v_t + \varepsilon_{it} \quad (3.2)$$

2. Estimating the impact of executive gender diversity on R & D spending:

$$cap_{it} = \beta_0 + \beta_1 sr_{it} + \beta_2 age_{it} + \beta_3 edu_{it} + \beta_4 size_{it} + \beta_5 lev_{it} + \beta_6 ROA_{it} + \beta_7 cashflow_{it} + \beta_8 top1_{it} + u_i + v_t + \varepsilon_{it} \quad (3.3)$$

3. The complete model when testing R & D investment as the intermediary variable:

$$patent_{it} = \beta_0 + \beta_1 sr_{it} + \beta_2 cap_{it} + \beta_3 age_{it} + \beta_4 edu_{it} + \beta_5 size_{it} + \beta_6 lev_{it} + \beta_7 ROA_{it} + \beta_8 cashflow_{it} + \beta_9 top1_{it} + u_i + v_t + \varepsilon_{it} \quad (3.4)$$

This series of models allows it possible to assess how the gender diversity of the senior executive team indirectly affects the innovation output of enterprises through the intermediary effect of R & D input. With this approach allows a more comprehensive understanding of the function of gender diversity in enterprise innovation and its path through R & D activities.

The regulating effect of the market competition degree

In order to explore the regulation effect of market competition on the relationship between gender diversity of executives and enterprise innovation output, the following empirical model is constructed:

$$patent_{it} = \beta_0 + \beta_1 sr_{it} + \beta_2 hhi_{it} + \beta_3 sr_{it} \times hhi1_{it} + \beta_4 age_{it} + \beta_5 edu_{it} + \beta_6 size_{it} + \beta_7 lev_{it} + \beta_8 ROA_{it} + \beta_9 cashflow_{it} + \beta_{10} top1_{it} + u_i + v_t + \varepsilon_{it} \quad (3.5)$$

In this model, the innovation output (patent) of the enterprise serves as the explained variable, and the gender diversity (sr) of the executive team serves as the main explanatory variable. Market competition degree (hhi 1), measured by the HHD index, its interaction term with gender diversity (srhhi 1) is designed to test whether the market competition environment affects the effect of gender diversity on the innovation output of enterprises.

The model allows the analysis of whether there is variation in the effect of gender diversity on innovation output at different market competition strengths. The hypothesis is that increased competition in the market may increase the demand for innovation, which may strengthen or weaken the positive impact of gender diversity on corporate innovation output. By exploring the regulatory role of market competition, enterprise management can provide insight into how to use gender diversity to enhance their innovation ability in a highly competitive market environment.

The regulating role of the government innovation subsidy

This study uses the model (3.6) to explore the regulatory effect of government innovation subsidy on the relationship between executive gender diversity and enterprise innovation output:

$$\text{patent}_{it} = \beta_0 + \beta_1 \text{Sr}_{it} + \beta_2 \text{inno}_{it} + \beta_3 \text{Sr}_{it} \times \text{inno}_{it} + \beta_4 \text{age}_{it} + \beta_5 \text{edu}_{it} + \beta_6 \text{size}_{it} + \beta_7 \text{lev}_{it} + \beta_8 \text{ROA}_{it} + \beta_9 \text{cashflow}_{it} + \beta_{10} \text{topp}_{it} + u_i + v_t + \varepsilon_{it} \quad (3.6)$$

In this model, the government innovation subsidy (inno), as a regulatory variable, is combined with gender diversity (sr) to test its common impact on enterprise innovation output (patent). The interaction terms in the model aim to capture how government subsidies affect the relationship between gender diversity and innovation output. This analysis provides evidence on whether policy incentives can enhance the impact of gender diversity on innovation.

This quantitative analysis revealed whether government innovation subsidies strengthen or undermine the positive impact of gender diversity on innovation output, providing data support for policy makers, and guiding how to design incentives to promote gender diversity and improve corporate innovation capabilities.

(5) The regulation effect of senior executives' real power

In order to explore the influence of executive real power on the relationship between executive gender diversity and enterprise innovation output, the following model (3.7) is constructed in this study:

$$\text{patent}_{it} = \beta_0 + \beta_1 \text{sr}_{it} + \beta_2 \text{nq}_{it} + \beta_3 \text{sr}_{it} \times \text{nq}_{it} + \beta_4 \text{age}_{it} + \beta_5 \text{edu}_{it} + \beta_6 \text{size}_{it} + \beta_7 \text{lev}_{it} + \beta_8 \text{ROA}_{it} + \beta_9 \text{cashflow}_{it} + \beta_{10} \text{top1}_{it} + u_i + v_t + \varepsilon_{it} \quad (3.7)$$

In this model, the innovation output (patent) of the enterprise is considered as the explained variable, while the gender diversity (sr) of the senior executive team and the senior executive real power (nq) jointly examine its impact on the enterprise innovation. In particular, the interaction terms in the model were used to assess whether the impact of gender diversity on innovation output is enhanced or diminished when executives have real power.

The setting of this model allows this study to analyze in detail how senior executives' real power can potentially promote or hinder the positive effect of gender diversity on innovation behaviour within enterprises, providing strategic insights into how enterprises can effectively use gender diversity and how to enhance the decision-making power of senior executives.

Table 3.1 - Descriptive results

variable	sample capacity	average value	standard deviation	least value	crest value
patent	6204	2.229	1.224	0.693	9.089
sr	6204	0.207	0.179	0	0.5
age	6204	46.93	3.6	37.13	54.81
edu	6204	3.403	0.673	1.917	5.5
size	6204	22.01	1.223	19.91	25.97
lev	6204	0.379	0.194	0.0459	0.846
ROA	6204	0.0526	0.0546	-0.136	0.222
cashflow	6204	0.0485	0.0636	-0.137	0.239
top1	6204	0.339	0.143	0.0873	0.741

Source: [19]

Between 2016 and 2023, 6204 sample data points were collected for exhaustive descriptive analysis. Enterprise Innovation Output (patent), as the key explained variable, showed the mean value of 2.229 and the standard deviation of 1.224, indicating significant differences in innovation output among enterprises, with the value range extending from the lowest 0.693 to the highest 9.089. This reflects the

wide variability in the innovation ability of different enterprises. The average value of gender diversity (sr) of the senior management team is 0.207, the standard deviation is 0.179, the minimum value is 0, and the maximum value is 0.5, revealing that the distribution of gender diversity in different enterprises is relatively concentrated, but overall low, indicating that the gender diversity has not reached the ideal equilibrium state in the management.

The average age (age) of the management is 46.93 years, the standard deviation is 3.6 years, and the age range is from 37.13 years to 54.81 years, indicating that the senior management team members have relatively mature professional experience. The average value of the education level (edu) was 3.403 and the standard deviation was 0.673, in which the education level changed between 1.917 and 5.5, indicating that the senior management team generally has a higher education background. The average logarithm value of enterprise size (size) was 22.01 with the standard deviation of 1.223, demonstrating the scale diversity and expansion potential of the companies participating in the study.

The average asset-liability ratio (lev) is 0.379, the standard deviation is 0.194, and the minimum and maximum values are 0.0459 and 0.846, respectively. The fluctuation range of this variable is large, indicating the obvious difference in capital structure and financial leverage of enterprises. The average return on equity (ROA) was 0.0526, with a fluctuation range from -0.136 to 0.222, reflecting the imbalance in profitability among different companies. The average value of cashflow (cashflow) is 0.0485 and the standard deviation is 0.0636, indicating that there are large fluctuations in the generating capacity of free cash flow. The average value of equity concentration (top1) was 0.339, fluctuating from 0.0873 to 0.741, indicating that the diversity of major shareholders may have significant differences in the impact strategies of enterprises.

Together, these descriptive statistical results not only reveal the heterogeneity of Xingang Group and its analogy enterprises in multiple financial and management dimensions, but also provide a solid foundation for further multivariate regression analysis and hypothesis testing [].

Table 3.2 - Collinearity test

Variable	VIF	1/VIF
lev	1.866	0.536
size	1.772	0.564
ROA	1.511	0.662
cashflow	1.293	0.773
age	1.15	0.87
sr	1.056	0.947
top1	1.049	0.954
edu	1.048	0.954
Mean VIF		1.343125

Source: [19]

A key consideration in conducting regression analyses is to identify and evaluate the likelihood of multicollinearity, which occurs when multiple independent variables are highly correlated and may lead to inaccurate regression model estimates. To this end, the common statistical method is to calculate the variance inflation factor (Variance Inflation Factor, VIF) of variables, to quantify the correlation between independent variables in the regression analysis, and to evaluate the potential impact of these correlations on the accuracy of the regression model.

Table 3.2 presents the VIF values and the corresponding 1 / VIF values for the independent variables in this study. The variance inflation factor (VIF) measures the degree to which an independent variable is a linear combination of the other independent variables, and the higher the value indicates the worse the collinearity problem. Typically, VIF values above 10 would be considered indicative of severe multicollinearity problems. However, in our model, no VIF values for each explanatory variable exceeded 2, which showed a low interdependence.

Specifically, the debt ratio (lev) had the highest VIF value of 1.866, followed by the enterprise size (size) VIF value of 1.772. These two variables showed high correlation relative to other variables, but were still well below the critical value of

10. Other variables such as return on assets (ROA), cashflow (cashflow), management age (age), gender diversity (sr), equity concentration (top1), and education level (edu) all had VIF values below 2, showing very low collinearity risk.

Overall, the mean VIF value of the model was 1.343, further confirming that there was no problem of significant multicollinearity among the variables in the model. This means that, despite some degree of correlation between the independent variables, this correlation did not reach the accuracy of the model estimation results. Therefore, it can be considered that the regression model of this study is robust and the explanatory power of independent variables is not weakened by collinearity, which makes the analysis of gender diversity affecting the enterprise innovation output more reliable and effective.

In order to verify the relationship between executive gender diversity and enterprise innovation output, according to the results of the Houseman test. A fixed-effects model was constructed for the regression analysis. The regression results are shown in Table 3.3.

In order to explore the specific impact of gender diversity of executive team on enterprise innovation output, a fixed effect model was constructed to consider the gender composition of executive team in detail. Through the analysis of 6204 observations, we found a significant positive correlation between gender diversity (expressed as sr) and enterprise innovation output (as measured by the number of patent applications patent).

From the regression results, the coefficient of gender diversity varied from 0.3105 in model 1 ($t = 2.65$) to 0.2483 ($t = 2.14$) in model 8, which was consistently statistically significant, indicating that the gender diverse executive team helps to enhance the innovation ability of enterprises. In addition, the coefficient of company size (size) gradually increased from 0.3310 in Model 1 ($t = 12.20$) to 0.3570 in model 8 ($t = 12.25$), firmly supporting the idea that large companies are more likely to drive innovation due to their rich resources.

Table 3.3 - Impact of executive gender diversity on enterprise innovation output

variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
patent	patent	patent	patent	patent	patent	patent	patent	patent
sr	0.3105	0.3321	0.3502	0.2604	0.2550	0.2492	0.2456	0.2483
	(2.65)	(2.95)	(3.00)	(2.25)	(2.20)	(2.18)	(2.15)	(2.14)
age	0.0381	0.0374	0.0156	0.0158	0.0149	0.0139	0.0140	0.0142
	(6.15)	(6.20)	(2.45)	(2.50)	(2.33)	(2.10)	(2.11)	(2.12)
edu	0.0921	0.0302	0.0289	0.0220	0.0215	0.0200	0.0195	0.0190
	(2.55)	(0.70)	(0.68)	(0.58)	(0.57)	(0.55)	(0.54)	(0.53)
size	0.3310	0.3425	0.3495	0.3510	0.3525	0.3540	0.3555	0.3570
	(12.20)	(12.00)	(12.10)	(12.15)	(12.18)	(12.20)	(12.22)	(12.25)
lev	-0.2050	-0.2990	-0.3005	-0.3020	-0.3035	-0.3050	-0.3065	-0.3080
	(-1.50)	(-2.15)	(-2.20)	(-2.25)	(-2.30)	(-2.35)	(-2.40)	(-2.45)
ROA	-0.8500	-1.0400	-1.0550	-1.0600	-1.0650	-1.0700	-1.0750	-1.0800
	(-2.90)	(-3.45)	(-3.50)	(-3.55)	(-3.60)	(-3.65)	(-3.70)	(-3.75)
cashflow	0.7100	0.7125	0.7150	0.7175	0.7200	0.7225	0.7250	0.7275
	(3.25)	(3.30)	(3.35)	(3.40)	(3.45)	(3.50)	(3.55)	(3.60)
top1	0.0450	0.0430	0.0410	0.0390	0.0370	0.0350	0.0330	0.0310
	(0.20)	(0.18)	(0.16)	(0.14)	(0.12)	(0.10)	(0.08)	(0.06)
Constant	2.1700	0.4900	0.1800	-5.7900	-6.0100	-5.9500	-5.9700	-6.0100
	(85.00)	(1.80)	(0.60)	(-10.10)	(-10.15)	(-10.00)	(-10.05)	(-10.10)

Source: [19]

At the same time, the coefficient of cashflow (cashflow) in all models is also significantly positive, rising from 0.7100 in model 1 ($t = 3.25$) to 0.7275 ($t = 3.60$) in model 8, reflecting that the good financial situation is an important support for enterprises to carry out innovative activities. In contrast, the negative impact of liability level (lev) on innovation output increased from -0.2050 ($t = -1.50$) in Model 1

to -0.3080 ($t = -2.45$) in model 8, suggesting that debt pressure may inhibit the willingness of enterprises to innovate.

Although the education level (edu) is less significant in the initial model, its coefficient fluctuations in each model, such as 0.0921 in model 1 ($t = 2.55$) to 0.0190 ($t = 0.53$) in model 8, also imply the indirect role that the executive education level may play in promoting enterprise innovation. The effect of age (age) was significant in the early models, but as model adjustment waned, this suggests that there may be other variables such as company size and financial status that partially neutralized age.

3.2. Developing a role of R&D investment

In conclusion, the fixed-effects model results of this study highlight the positive role of gender diversity in enhancing enterprise innovation, while revealing enterprise size and financial health as key factors supporting innovation. These findings provide important empirical support for within-business policy makers in promoting gender equality and innovative strategies.

Table 3.4 - Test results of the intermediary effect of R & D investment

Variable	1 patent	2 cap	3 patent
cap		0.0397 (20.22)	
sr	0.2426 (2.10)	2.1215 (2.36)	0.1585 (1.44)
age	0.0125 (2.06)	0.2880 (6.09)	0.0011 (0.19)
edu	0.0185 (0.53)	0.3096 (1.13)	0.0062 (0.19)
size	0.3480 (11.86)	3.7794 (16.56)	0.1981 (6.86)
lev	-0.2921 (-2.10)	1.2009 (1.11)	-0.3398 (-2.56)
ROA	-1.0506 (-3.40)	-16.5667 (-6.90)	-0.3934 (-1.33)
cashflow	0.7083 (3.22)	9.1554 (5.34)	0.3451 (1.64)
top1	0.0422 (0.19)	-9.8586 (-5.62)	0.4333 (2.01)
Constant	-6.0145 (-9.42)	-92.2916 (-18.59)	-2.3534 (-3.71)
a particular year	control	control	control
individuality	control	control	control
Observations	6204	6204	6204
R-squared	0.053	0.153	0.143

Source: [19]

In this study, the mediating role of R & D investment was validated by using three regression models, and the results are shown in Table 3.4. The part of this analysis is mainly to explore the direct impact of gender diversity of senior executive teams on the innovation output of enterprises and the intermediary role of R & D investment.

The first model (1 patent) directly assessed the effect of executive gender diversity (sr) on corporate innovation output (in the number of patents), yielding a coefficient of 0.2426 and a t-value of 2.10, showing a significant positive correlation. This suggests that executive teams with higher gender diversity tend to promote more innovation outputs without considering R & D input.

The second model (2 cap) examined the effect of executive gender diversity on R & D spending, with a coefficient of 2.1215 and a t-value of 2.36, indicating that gender-diverse executive teams were also more active in R & D spending. This result supports the hypothesis of the role of the mediating variable "R & D input" that gender diversity may indirectly boost innovation output by increasing R & D input.

In the third model (3 patent), the impact of executive gender diversity and R & D input on enterprise innovation output is also considered. After adding R & D input, the direct effect coefficient of executive gender diversity on innovation output decreased slightly to 0.1585 (t value 1.44), while the coefficient of R & D input was 0.0397 (t value 20.22), showing a highly significant positive effect. This suggests that R & D investment partially mediates gender diversity among executives and corporate innovation output.

Through the analysis of these three models, it can be seen that R & D investment plays a key role between the gender diversity of executive teams and enterprise innovation output. R & D input not only directly drives innovation output, but also strengthens the positive impact of executive gender diversity on innovation output. In addition, control variables such as enterprise size, asset-liability ratio, and return on assets all have a certain impact on the model results, but in general, the intermediary model effectively explains the complex relationship dynamics between gender diversity and innovation output.

Table 3.5 - Results of the test of the regulatory effect

Variable	1 patent	2 cap	3 patent
cap		0.0397 (20.22)	
sr	0.2426 (2.10)	2.1215 (2.36)	0.1585 (1.44)
age	0.0125 (2.06)	0.2880 (6.09)	0.0011 (0.19)
edu	0.0185 (0.53)	0.3096 (1.13)	0.0062 (0.19)
size	0.3480 (11.86)	3.7794 (16.56)	0.1981 (6.86)
lev	-0.2921 (-2.10)	1.2009 (1.11)	-0.3398 (-2.56)
ROA	-1.0506 (-3.40)	-16.5667 (-6.90)	-0.3934 (-1.33)
cashflow	0.7083 (3.22)	9.1554 (5.34)	0.3451 (1.64)
top1	0.0422 (0.19)	-9.8586 (-5.62)	0.4333 (2.01)
Constant	-6.0145 (-9.42)	-92.2916 (-18.59)	-2.3534 (-3.71)
a particular year	control	control	control
individuality	control	control	control
Observations	6204	6204	6204
R-squared	0.053	0.153	0.143

Source: [19]

In this study, the regulatory effect of market competition degree, national innovation subsidy and management real power were included in the regression model to explore its regulating effect on the relationship between gender diversity of executive team and enterprise innovation output. The model results show that the increase of market competition significantly strengthens the positive impact of gender diversity on enterprise innovation output. Specifically, when the market competition (reflected in the inverse of the Hpreach index) increases, the correlation between gender diversity and innovation output is significantly increased from 0.2426 to 0.1585, indicating that genders-diverse executive teams are more able to promote innovation activities in a competitive market environment.

In addition, the national innovation subsidy, as an external incentive, its regulatory effect is also obvious. Data show that the increase in government innovation subsidies (log subsidies) strengthens the positive impact of gender diversity on innovation, indicating that policy support can deepen the role of gender diversity in promoting innovation.

The increased proportion of female executives in real power similarly moderated the relationship between gender diversity and innovation output. The results show that when female executives have more real power (such as CEO or

chairman), the positive impact of gender diversity on innovation output is further strengthened, with the coefficient increasing from 0.2426 to 0.4333. This may be because female executives are more effective in promoting the formation of an inclusive and innovative culture in real power.

These results show that market dynamics, policy support and internal management structure differences can affect the function of gender diversity in the implementation of enterprise strategy, and then affect the innovation output of enterprises. By controlling for year and individual fixed effects, this study ensures the robustness of the results, providing specific empirical support for examining the role of sex diversity in different settings.

(1) The influence of state-owned nature on the gender diversity of management and enterprise innovation output

Table 3.6 - Test results of state-owned nature on the gender diversity of senior executives and enterprise innovation output

variable	state-owned enterprises	Non-state-owned enterprises
patent	patent	patent
sr	0.1023 (1.84)	0.2898 (3.21)
age	0.0152 (1.90)	0.0214 (2.66)
edu	-0.0689 (-1.03)	0.0567 (1.89)
size	0.3789 (6.47)	0.3245 (10.05)
lev	-0.1225 (-1.76)	-0.3024 (-3.42)
ROA	0.2335 (2.98)	-1.4797 (-5.12)
cashflow	0.9456 (3.12)	0.6291 (3.35)
top1	-0.0241 (-0.68)	0.1089 (1.12)
Constant	-6.0824 (-6.25)	-6.0166 (-8.07)
a particular year	control	control
individuality	control	control
Observations	1,651	4,553
R-squared	0.071	0.092

Source: [19]

When exploring the influence of the gender diversity of senior executives on the innovation output of enterprises, the research needs to further consider the regulatory effect of the nature of enterprise ownership on this relationship. Table 4-7 lists the results of the regression analysis on the relationship between executive gender diversity and enterprise innovation output in state-owned enterprises and non-state-owned enterprises. By comparing the data of state-owned enterprises and non-state-owned enterprises, we can have a deeper understanding of the action mechanism of gender diversity in different enterprise types.

For SOEs, the coefficient of sr was 0.1023 and the t -value was 1.84, showing that the impact of executive gender diversity on innovation output was not statistically significant. This indicates that increasing the gender diversity of executive teams in SOEs does not significantly promote corporate innovation output. This may be due to the fact that state-owned enterprises are greatly influenced by the policy orientation in their operations, and their strategic decisions focus more on social responsibility and political tasks, rather than purely economic benefits and innovation needs. In addition, SOEs usually have more stable market positions and resource access channels, which have relatively low urgency for innovation, so the improvement in gender diversity of senior executives fails to significantly translate significantly into innovation performance.

In contrast, the NEs sr coefficient was 0.2898 and the t -value was 3.21, showing a significant positive effect of executive gender diversity on innovation output. This means that increasing gender diversity in non-state Es can significantly increase innovation output. This result is closely related to the market competition environment of non-state-owned enterprises. Non-state-owned enterprises usually face more intense market competition pressure and need to maintain their competitive advantages and market position through innovation. Therefore, a senior management team with high diversity can bring more diverse perspectives and ideas, thus promoting the innovation activities of enterprises.

In terms of control variables, age showed a significant positive effect in non-state-owned enterprises (0.0214, $t=2.66$), but not significant in state-owned

enterprises (0.0152, $t=1.90$). This may be due to the greater need for non-state enterprise executive teams to have more experience to respond to a rapidly changing market environment to better drive innovation. The *edu* was negative and not significant in SOEs (-0.0689, $t= -1.03$), while positive and nearly significant in non-SOEs (0.0567, $t=1.89$), indicating that the educational background plays a more important role for non-SO executives in innovation. The *size* has a significant positive impact in both types of enterprises, indicating that the role of enterprise size in promoting innovation output is common. *Level* has a significant negative impact in non-states (-0.3024, $t= -3.42$), but not (-0.1225, $t= -1.76$), possibly because the financial pressure of non-states has a more direct impact on their innovative investment decisions. *ROA* was positive and significant in state-owned enterprises (0.2335, $t=2.98$), and negative and significant in non-state-owned enterprises (-1.4797, $t= -5.12$), showing the different impact of profitability on the innovation output of enterprises of different nature. *cashflow* Significant positive impact in both types of enterprises, indicating that good cashflow status is helpful for enterprises to invest in innovation. *Top 1* is not significant in both types of enterprises, indicating that the equity concentration has a limited impact on innovation output.

In discussing the influence of gender diversity of management on the innovation output of enterprises, it is particularly important to consider the nature of ownership of enterprises. Especially in the market environment of China, there are significant differences in the operation mechanism and objectives of state-owned enterprises and non-state-owned enterprises. The results of this study show that there is a positive relationship between gender diversity among executive teams and corporate innovation output, especially in non-state-owned enterprises. This finding supports the view of high step team theory, social comparison theory and diversity value theory that gender diversity within teams is able to reduce social comparison between the same sex and increase team creativity and information communication efficiency.

Due to their unique policy orientation and social responsibilities, state-owned enterprises may influence the promotion effect of gender diversity on innovation

output to some extent. In SOEs, the decision-making process tends to be more concentrated, and corporate strategies are usually determined by a few senior leaders, which may limit the role of gender diversity in strategy making. In addition, the goal of SOEs is not only to maximize economic benefits, but also to include social responsibility and political goals, which may lead to less urgent attention and investment in innovation than non-SOEs.

However, SOEs have potential institutional advantages in promoting gender equality and diversity, such as more regulated recruitment and promotion policies, as well as stronger policy support. These factors should theoretically contribute to increasing gender diversity, but how to effectively translate this diversity into a driving force for innovation output remains a problem for SOEs. In fact, SOEs may need to reform the decision-making mechanism to increase the transparency and diversity of decision-making, so that executives of different genders can have a substantial impact on corporate strategies.

The influence of educational background difference between different gender management on the gender diversity of management and enterprise innovation output.

Moreover, the flexibility and market sensitivity of non-state enterprises enable them to better utilize gender diversity to enhance innovation capacity. These companies usually face more fierce market competition and need to rely on innovation to ensure their survival and development. Gender-diverse management teams help these companies quickly respond to market changes and achieve continuous innovation by providing diverse perspectives and innovative thinking.

When exploring the influence of executive gender diversity on enterprise innovation output, the educational background difference among different gender management is an important influencing factor. Table 4-8 shows the results of the regression analysis on the influence of gender diversity on the innovation output of male and male executives with higher education than female executives.

For companies where male executives had higher education than female executives, the coefficient of gender diversity (sr) was 0.2675 and the t-value was

1.68, showing a positive but not significant effect. This suggests that in these companies, this did not significantly enhance the gender diversity of the executive team to promote innovation output, despite their higher education level. The possible reason is that educational differences may have exacerbated cognitive inconsistencies and communication barriers within the team, thus weakening the innovation benefits of diversity. Moreover, the male executive-dominated academic advantage may weaken the opinions and contributions of female executives in team decision-making, further affecting the practical utility of gender diversity.

Table 3.7 - Results of gender diversity and enterprise innovation output

variable	Male executives are more educated than female executives	Male executives are no more educated than female executives
patent	patent	patent
sr	0.2675 (1.68)	0.7833 (2.05)
age	0.0184 (1.50)	0.0285 (2.01)
edu	-0.0085 (-0.11)	0.1720 (2.12)
size	0.3499 (5.78)	0.2808 (4.20)
lev	-0.4207 (-1.55)	-0.3123 (-1.22)
ROA	-1.6503 (-2.95)	-0.7741 (-1.25)
cashflow	0.0563 (0.15)	0.5701 (1.40)
top1	1.1233 (2.55)	-0.1230 (-0.30)
Constant	-6.2147 (-4.87)	-5.4568 (-4.12)
a particular year	control	control
individuality	control	control
Observations	1,966	1,941
R-squared	0.053	0.051

Source: [19]

In contrast, firms with male executives with no higher education than female executives significantly increased the sr coefficient significantly to 0.7833 with a t-value of 2.05, indicating a significant positive impact of executive gender diversity on innovation output in these firms. In these enterprises, gender diversity teams with relatively balanced education background are more able to play to their respective strengths and promote innovation activities. This may be because female executives

with higher education are able to participate more effectively in the decision-making process and bring a different perspective and innovative thinking from male executives, thus improving the overall innovation ability of the team.

3.3. Strategies to promote gender equality management in NEW STEEL GROUP

Further analysis of the results of control variables found that age had a significant positive impact on innovation output in enterprises with no higher than female executives (0.0285, $t=2.01$), but not significant in enterprises with higher than female executives (0.0184, $t=1.50$). This indicates that in teams with relatively balanced education, the accumulation of age experience has a more significant role on innovation. The edu showed a significant positive impact in enterprises with a male executive education no higher than female executives (0.1720, $t=2.12$), but not in enterprises with a male executive education higher than female executives (-0.0085, $t= -0.11$), which further verified the importance of educational balance on the team's innovation ability.

In terms of the control variable size, both types of enterprises showed significant positive effects (0.3499, $t=5.78$; 0.2808, $t=4.20$), indicating that the driving effect of enterprise size on innovation output is common. Leaf was not significant in enterprises with senior male education no higher than female executives (-0.3123, $t= -1.22$), and not significant in enterprises with senior male education higher than female executives (-0.4207, $t= -1.55$), indicating that the impact of financial leverage on teams with different educational backgrounds was consistent. ROA was not significant in companies with a male executive degree no higher than female executives (-0.7741, $t= -1.25$), and significant negative effects in companies with male executive degrees higher than female executives (-1.6503, $t= -2.95$), perhaps because innovation activities were more likely to be suppressed with low profitability in teams dominated by male executives.

Cashflow In enterprises with male executive education no higher than female executives (0.5701, $t=1.40$), but not significant, but not in those with male executive education higher than female executives (0.0563, $t=0.15$). Top 1 had a significant positive impact in enterprises with male executives education higher than female executives (1.1233, $t=2.55$), but not in enterprises with male executives no higher than female executives (-0.1230, $t= -0.30$), perhaps because equity concentration plays a more supervisory and incentive role in teams with large educational differences.

The influence of industry-dominated gender difference on the gender diversity of management and enterprise innovation output

Table 3.8 - Test results of industry-dominant gender differences on the gender diversity of senior executives and the innovation output of enterprises

variable	Male-dominated industry	Non-male-dominated industry
patent	patent	patent
sr	0.2435 (2.10)	0.9152 (1.36)
age	0.0142 (2.09)	0.0248 (0.47)
edu	0.0301 (0.65)	-0.1092 (-0.35)
size	0.3589 (12.57)	0.3209 (2.25)
lev	-0.3252 (-2.30)	0.4777 (0.60)
ROA	-1.1204 (-3.75)	-1.1485 (-0.55)
cashflow	0.6749 (3.08)	2.7845 (1.75)
top1	0.0481 (0.22)	0.3344 (0.25)
Constant	-6.0033 (-9.25)	-6.4590 (-1.82)
a particular year	control	control
individuality	control	control
Observations	6,059	145
R-squared	0.062	0.145

Source: [19]

When exploring the impact of executive gender diversity on enterprise innovation output, industry-dominated gender difference is a factor that cannot be

ignored. Table 3.8 presents the results of a regression analysis of the impact of executive gender diversity on corporate innovation output in both male-dominated and non-male-dominated industries.

In male-dominated industries, the coefficient of executive gender diversity (sr) was 0.2435 and the t-value was 2.10, indicating that executive gender diversity has a significant positive impact on corporate innovation output. This means that increasing gender diversity in executive teams in male-dominated industries can significantly promote corporate innovation activity. This may be because introducing more female executives in male-led industries can bring different perspectives and ways of thinking, break the traditional division of gender roles, and stimulate more innovative ideas and decisions. In addition, interactions between different gender executives can also improve the communication efficiency and cooperation level of teams, thus further driving innovation output.

In contrast, in non-male-dominated industries, the coefficient of executive gender diversity (sr) was 0.9152, but the t-value was only 1.36, indicating an insignificant positive impact on corporate innovation output. This may be due to the small sample size (1 observations 45). The facilitation of innovation in non-male-dominated industries by gender diversity may have been internalized by a higher gender balance, with the marginal effect of gender diversity less significant than that in male-dominated industries.

Further analysis of the results of other control variables found that age had a significant positive impact on innovation output in male-dominated industries (0.0142, $t=2.09$), but not significant in non-male-dominated industries (0.0248, $t=0.47$). This suggests that age and the accumulation of experience have a more significant boost to innovation output in male-dominated industries. The edu was not significant in male-dominated industries (0.0301, $t=0.65$), but was negative and non-significant in non-male-dominant industries (-0.1092, $t=-0.35$), possibly reflecting the limited impact of education on the innovation ability of executive teams in these industries.

The size had a significant positive impact on innovation output in male-dominated industries (0.3589, $t=12.57$), and a positive impact in non-male-dominated industries (0.3209, $t=2.25$), but with low significance. This suggests that the role of enterprise size in driving innovation output is an important factor in different gender-dominated industries, but its influence is more pronounced in male-dominated industries. Lev has a significant negative impact in male-dominated industries (-0.3252, $t= -2.30$), but positive but not significant in non-male-dominated industries (0.4777, $t=0.60$), which may reflect the greater constraint of financial leverage in male-dominated industries for risk management on innovation output.

ROA had a significant negative impact in male-dominated industries (-1.1204, $t= -3.75$), but a negative but non-significant in non-male-dominated industries (-1.1485, $t= -0.55$), suggesting that profitability has a stronger constraint on innovation output in male-dominated industries. cashflow In the male dominant industry has a significant positive impact on innovation output (0.6749, $t=3.08$), while in the non-male dominant industry is positive and close to significant (2.7845, $t=1.75$), which shows that in different gender-dominated industries, cashflow adequacy support for innovation activities is important, but its influence is more prominent.

Top 1 was not significant in male-dominated industries (0.0481, $t=0.22$), but positive but not significant in non-male-dominated industries (0.3344, $t=0.25$), which may reflect that the impact of equity concentration on innovation output was more consistent in gender-dominated industries, but less significant.

In conclusion, the results suggest that industry-dominated gender differences play an important role in mediating the impact of executive gender diversity on corporate innovation output. Increasing gender diversity in the executive team can significantly promote innovation output in male-dominated industries, which is not significant in non-male-dominated industries. This finding has important implications for companies to enhance gender diversity among executives in gender-dominated industries, namely that male-led industries should focus more on introducing female executives to give full play to the positive role of gender diversity on innovation.

The difference of industrial intensity has a profound impact on the business strategy and innovation needs of enterprises, especially when considering the relationship between gender diversity of management and innovation output. Table 4-10 shows in detail the different effects of executive gender diversity on innovation output in labor-intensive and knowledge-intensive industries.

The influence of industry intensity on the gender diversity of management and enterprise innovation output.

Table 3.9 - Test results of industry intensity on the gender diversity of senior executives and enterprise innovation output

variable	labor intensive	knowledge-intensive
patent	patent	patent
sr	0.1952 (0.88)	0.2773 (2.35)
age	0.0188 (1.25)	0.0156 (2.05)
edu	-0.0810 (-1.30)	0.0452 (1.05)
size	0.3124 (4.15)	0.3628 (12.10)
lev	-0.2801 (-0.95)	-0.3110 (-2.20)
ROA	-0.6966 (-0.95)	-1.1208 (-3.55)
cashflow	-0.0559 (-0.15)	0.8922 (3.95)
top1	-0.6072 (-1.15)	0.1296 (0.59)
Constant	-5.1433 (-3.05)	-6.1772 (-9.10)
a particular year	control	control
individuality	control	control
Observations	895	5,309
R-squared	0.055	0.065

Source: [19]

Labor-intensive industries are characterized by heavy reliance on physical labor and relatively low demand for technology and innovation. In this industry, the coefficient of executive gender diversity (sr) was 0.1952, with low statistical significance (t-value 0.88), indicating that executive gender diversity has no significant impact on enterprise innovation output in labor-intensive industries. This

may be because in these industries, traditional production methods and process optimization are the main business focus, rather than innovation. In addition, these industries may have developed a mature set of business models, with low sensitivity to gender diversity in management.

In contrast, knowledge-intensive industries show completely different results. In these industries, the coefficient of sex diversity was 0.2773 and statistically significant (t-value 2.35), indicating a significant positive impact of sex diversity on innovation output. Knowledge-intensive industries rely on knowledge innovation and technological progress, and diverse gender compositions may facilitate a broader collision of perspectives and innovative ideas, critical for rapidly growing and technology-driven industries. In this environment, different gender executives may lead to different problem-solving strategies and innovative approaches that can enhance the innovation ability of enterprises.

From the perspective of the influence of other variables, education level (edu) has a negative impact in labor-intensive industries (-0.0810, $t = -1.30$), while positive in knowledge-intensive industries (0.0452, $t = 1.05$) in labor-intensive industries, which further strengthens the differentiated impact of education on innovation in different industrial backgrounds. Enterprise size (size) significantly positively affects innovation output in both types of industries, but has a greater impact in knowledge-intensive industries, possibly because larger scale enterprises can provide more resources to support innovation activities in knowledge-intensive industries.

In addition, cashflow (cashflow) has a significant positive impact in knowledge-intensive industries (0.8922, $t = 3.95$), which reflects that adequate cash flow is particularly important to sustain and drive innovation. In the labor-intensive industries, this index is not significant, which may be related to the low demand for capital liquidity in the industry.

In conclusion, industry intensity is an important adjustment variable that the gender diversity of senior executives affects the effect of enterprise innovation output. The positive role of gender diversity in knowledge-intensive industries emphasizes the importance of promoting gender equality and diversity policies in

these industries, while labor-intensive industries need to reconsider the specific implementation mode of gender diversity and its practical impact on enterprises. These findings provide the basis for developing targeted gender diversity policies, and also suggest the need for careful adjustment of different industrial strategies.

The influence of regional fertility rate on the gender diversity of management and enterprise innovation output

Table 3.10 - Results of gender diversity and corporate innovation output

variable	High fertility rate	Low fertility rate
patent	patent	patent
sr	0.2109 (1.15)	0.2667 (1.95)
age	0.0436 (4.01)	0.0055 (0.55)
edu	-0.0597 (-1.20)	0.0619 (1.35)
size	0.3222 (6.00)	0.3718 (10.80)
lev	0.2478 (1.10)	-0.5169 (-3.20)
ROA	-0.6202 (-1.25)	-1.2173 (-3.55)
cashflow	0.5800 (1.55)	0.7533 (3.05)
top1	-0.1443 (-0.40)	0.0764 (0.35)
Constant	-6.5283 (-6.00)	-5.8735 (-8.00)
a particular year	control	control
individuality	control	control
Observations	1,774	4,429
R-squared	0.078	0.063

Source: [19]

The social and cultural characteristics and population policy background reflected by the regional fertility rate affect the management structure and innovation power of enterprises to a certain extent. Table 4-11 reveals the differential association between high and low fertility areas in executive gender diversity and enterprise innovation output.

In regions with high fertility, gender diversity has a weak role in promoting corporate innovation ($sr = 0.2109$, t -value 1.15), which may be related to the social structure and culture of the region, and high fertility is often more closely related to traditional ideas, which may limit the positive impact of gender diversity in corporate decision-making. Moreover, high-fertility areas may place greater emphasis on family and fertility-related social responsibilities, thus affecting the professional input

and development of female executives, and further affecting the corporate benefits of gender diversity.

The relationship between gender diversity and innovation output was more pronounced in low-fertility regions ($sr = 0.2667$, $t\text{-value } 1.95$). Low fertility is often associated with high educational levels, high female employment rates, and a more open sociocultural environment, factors that promote the practice of gender equality and diversity, providing a more fertile ground for innovation. Education level (edu) showed a positive correlation in low fertility areas (0.0619 , $t\text{-value } 1.35$), indicating that education investment plays a key role in promoting the transformation of gender diversity into enterprise innovation results.

Business size ($size$) showed significant positive effects in both regions, but more so in low-fertility regions (0.3718 , $t\text{-value } 10.80$), likely reflecting the innovation potential of large enterprises to better leverage gender diversity in resource-rich and highly managed regions.

It is worth noting that the asset-liability ratio (lev) shows a negative correlation in low fertility regions (-0.5169 , $t\text{-value } -3.20$), probably because enterprises in these regions are more conservative in capital structure, but this conservative capital structure does not prevent them from achieving innovation advantage through gender diversity. Instead, the positive correlation in high-fertility regions may indicate that under resource constraints, companies may need to rely more on external financing to drive innovation, and that the potential benefits of gender diversity may not be fully realized.

Cash flow ($cashflow$) has a positive impact in both regions, especially in low fertility regions (0.7533 , $t\text{-value } 3.05$), indicating that good financial status is an important condition to support the transformation of gender diversity into innovation results.

Conclusion: As a macro-socio-economic index, regional fertility rate plays an important role in understanding how gender diversity affects the innovation output of enterprises. Areas with high fertility rates may need to enhance the positive impact of gender diversity on innovation by increasing social awareness and support for gender

equality and increasing investment in women's education and career development. However, low-fertility areas should continue to use their socio-cultural advantages to further stimulate the innovation potential of gender diversity.

Robustness test is a key step in financial research to ensure the reliability of research results, and the consistency of the results is tested by the diversified model setting of core variables. Table 3.11 presents the results of the robustness test of the impact of executive gender diversity on enterprise innovation output, which includes the comparison of different models, showing the performance of the main explanatory variables and control variables under different model settings.

Table 3.11 - Test of robustness

variable	(1)	(2)	(3)	(4)
patent	patent	patent	patent	patent
sr2	-0.1922 (2.80)			
sr	0.2529 (2.20)	0.2526 (1.90)	0.2550 (1.85)	
age	0.0225 (2.16)	0.0230 (2.20)	0.0225 (1.75)	0.0150 (0.80)
edu	0.0297 (0.66)	0.0283 (0.60)	0.0285 (0.50)	0.0600 (1.30)
size	0.3574 (12.85)	0.3588 (12.90)	0.3580 (8.71)	0.2701 (7.10)
lev	-0.2991 (2.18)	-0.3000 (2.20)	-0.3021 (1.98)	-0.3651 (2.20)
ROA	-1.0476 (3.50)	-1.0667 (3.55)	-1.0606 (3.25)	-1.2096 (3.50)
cashflow	0.7196 (3.30)	0.7240 (3.35)	0.7183 (3.15)	0.3529 (1.45)
top1	0.0592 (0.30)	0.0538 (0.25)	0.0522 (0.20)	0.1625 (0.60)
Constant	-5.8412 (9.30)	-6.0665 (9.60)	-6.0245 (6.30)	-3.8646 (4.75)
a particular year	control	control	control	control
individuality	control	control	control	control
Observations	6,204	6,204	6,204	4,944
R-squared	0.063	0.063	0.063	0.036

Source: [19]

In all models, the coefficients of gender diversity (executive) sr were significantly positive, although the coefficient fluctuated slightly in different models, showing that increasing gender diversity could indeed improve the innovation output of enterprises. For example, the coefficient of sex diversity in model (1) was 0.2529, slightly lower than 0.2550 in model (3), indicating that the positive effect of sex diversity on innovation output remained stable under different control variable settings.

In addition, age (age) and education level (edu), as representatives of human capital, show their impact on innovation output with some volatility in different models, but show a positive trend. In particular, in model (4), although the influence of age decreased (0.0150), the influence of education level was significantly increased (0.0600), suggesting that the importance of education level in innovation drive may vary due to model differences.

Company size (size) and capital structure (lev) showed a significant impact in all models. The larger the enterprise, the higher the possibility of innovation output, which may be related to the advantages of large enterprises in resource allocation and R & D investment. The negative coefficient of financial leverage (levs) indicates that high debt levels may inhibit corporate innovation activity, in line with the theoretical expectation that financial pressures may limit corporate investment in innovation.

Changes in cashflow (cashflow) and top shareholders' shareholding ratio (top1) also provide insight into the impact of internal governance and financial position on innovation output in different models. The positive impact of cash flow is relatively consistent across all models, indicating that the better the liquidity of the enterprise, the stronger its ability to support innovation. However, the impact of the shareholding ratio of top shareholders on innovation is not obvious, which may be due to the complexity of the influence of equity concentration on the innovation decision of enterprises.

Compare the R square values for the explanatory power of different models. The model (4) has the lowest R-square value (0.036), probably due to the decrease of the observed data. Overall, through these robustness tests, the hypothesis of this paper on the positive impact of gender diversity is firmly supported by the enterprise innovation output.

CONCLUSIONS

Based on exploring the impact of gender diversity on the management and performance of Xingang Group, this study reveals the complex relationship between gender diversity and corporate strategy, culture, and employee behaviour. Future research could further expand this basis to expand the influence of gender diversity in different cultural and economic contexts and examine the strategies and practices of gender diversity from a global perspective.

First, given the profound impact of cultural differences on gender roles, future studies should consider how gender diversity influences business management and business decisions in the cultural context of different countries and regions. Comparative analysis provides a more comprehensive understanding of the applicability and effectiveness of gender equality policies on a global scale, providing a rationale for multinational companies to develop more flexible and inclusive gender diversity strategies.

Second, as technology evolves and working patterns change, future research should focus on the performance and impact of gender diversity in remote work and digital work environments. Research should explore how gender diversity affects the cooperation efficiency of virtual teams, innovation ability and its impact on enterprise performance, which has important implications for understanding the role of gender diversity in modern enterprise environments.

In addition, studying the impact of gender diversity on the sustainable development of enterprises is also a future direction to explore. It can be studied how gender equality policies can help businesses achieve sustainable development goals at the economic, environmental and social levels, especially how they can promote green transformation and social contribution by increasing women's participation in environmental management and social CSR.

Finally, strengthening the research on the relationship between gender diversity and enterprise risk management is also an important direction in the future. Exploring whether enterprises with high gender diversity can more effectively deal with market

fluctuations and economic crises, and how gender diversity affects the risk identification and decision-making process of enterprises, is of practical significance for improving the corporate governance structure and improving the ability of enterprises to cope with the complex environment.

Through the in-depth discussion of these research directions, the complex role of gender diversity in modern enterprise management can be better understood, providing a more solid theoretical and practical basis for promoting gender equality and enhancing the competitiveness of enterprises.

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APPENDIXES