STUDIES OF THE ROLE OF DUAL INNOVATION IN THE INNOVATION ROLE OF CHINESE ELECTRONIC INFORMATION MANUFACTURING ENTERPRISES: A MEDIATION MODEL AND IMPLICATIONS

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ABSTRACT: This article presents a conceptual model that examines the relationship between knowledge sharing, dual innovation (exploratory and exploitative), and innovation performance. The validation process involves conducting reliability and validity analysis, correlation analysis, regression analysis, and the Sobel test. The results indicate that both exploratory innovation and exploitative innovation have a strong positive impact on innovation. Additionally, both exploratory innovation and exploitative innovation greatly contribute to knowledge sharing. Research also reveals that knowledge sharing significantly enhances innovation performance. Furthermore, knowledge sharing acts as a partial mediator between dual innovation and innovation performance.

Keywords: Innovation Performance, Dual Innovation, Knowledge Sharing, Chinese Electronic Information Manufacturing Enterprises.

1. Introduction

Advancement in society and international competitiveness have always relied on the power of innovation. In this context, it is noteworthy to mention that China's dedication to research and development (R&D) has experienced remarkable growth, as evidenced by data from the National Bureau of Statistics (Shi & Yang, 2023). China has significantly increased its total social investment in R&D, going from 1.03 trillion yuan to 2.79 trillion yuan. This demonstrates China's strong commitment to technological advancement. In 2022, China's economic strength reached an impressive aggregate of 120 trillion yuan, solidifying its position as the second-largest economy globally (Dunford, 2023). Notably, more than 75% of China's total R&D investment came from corporate contributions, emphasising the crucial role of enterprise innovation in driving China's development. In today's highly competitive world, staying ahead of the game requires constant innovation. Companies must continuously adapt and find new ways to gain a competitive advantage. China's trajectory highlights the complex relationship between innovation, economic growth, and international competitiveness, solidifying its position as a powerful influence on the global innovation landscape.

China's electronic data manufacturing industry plays a crucial role in the country's economy. China's electronic data manufacturing industry has witnessed the emergence of several globally competitive electronic information manufacturing enterprises, including Huawei, Lenovo, Haier, and Xiaomi (Toccaceli Blasi, 2020). These companies have made significant contributions to the high-tech industry sector. Nevertheless, the expansion of China's electronic data manufacturing industry gives rise to three significant phenomena: first, the main limitations of the system are its lack of scalability, absence of ecological considerations, and insufficient progress in key technologies. The added value of China's electronic information manufacturing industry increased by 15.7% compared to the previous year, while the added value of high-tech manufacturing decreased by 2.5%. In 2022, China's electronic information manufacturing industry experienced a 7.6% year-on-year increase in added value, representing an 8.1% decrease compared to 2021 (Wang, 2024). The primary business revenue increased by 5.5% compared to the previous year, representing a 10.9% decrease from 2021. The total profit experienced a year-on-year decline of -13.1%, representing a decrease of 52% compared to 2021. Hence, in the current era of the digital industrial revolution, the focus for Chinese electronic data manufacturing enterprises is on enhancing their innovation performance and establishing sustainable competitive advantages.

The main issue for Chinese electronic information manufacturing firms is their insufficient innovation capabilities, which hinders their overall innovation performance. Many enterprises become trapped in a cycle of "introduction-absorption-reintroduction," relying too heavily on imitation and lacking the ability to innovate independently. Enterprises must balance the advantages of imitation with fostering independent innovation in order to overcome innovation hurdles that arise from new challenges, opportunities, and demands.

This study examines the innovation dynamics of electronic data manufacturing enterprises in China, focusing on the key factors that influence their innovation capabilities. This study aims to investigate the internal factors that influence enterprises' innovation performance, with the goal of identifying ways to

improve their innovation capabilities. This research aims to provide electronic information manufacturing firms in China with strategies to overcome the innovation trap and enhance independent innovation. By doing so, these firms will be better equipped to succeed in dynamic market environments and changing technological paradigms.

In the field of studying the impact of innovation in Chinese electronic information manufacturing enterprises, scholars have primarily concentrated on investigating external factors that drive innovation performance. These factors include the influence of talent acquisition, knowledge and technology, government subsidies, and information disclosure. There is a scarcity of research on endogenous driving forces. As a comprehensive innovation model, dual innovation can effectively address the issue of one-sided introduction or absorption. It allows enterprises to participate in a collaborative innovation ecosystem, balancing both imitation and independent innovation.

This article explores the relationship between dual innovation and the innovation role in Chinese electronic information manufacturing enterprises. It considers dual innovation as the independent variable and the innovation role as the dependent variable. The study examines the impact of innovation duality on the innovation performance of these enterprises. A logical framework is established, outlining the pathway from dual innovation to knowledge sharing and ultimately to innovation performance. This study focuses on a data set of 421 Chinese electronics manufacturing firms. Its goal is to empirically confirm the relationship between knowledge sharing and innovation outputs.

In addition, it aims to clarify how the process of dual innovation evolves into concrete innovation roles within these organisations. Through an in-depth analysis of these relationships, the research aims to provide valuable insights into improving innovation capabilities and performance within the unique context of China's electronic information manufacturing sector. In the ever-changing global landscape, it is crucial for enterprises to grasp and utilise the interplay between dual innovation and innovation role. This understanding can greatly enhance their growth and competitiveness. In conclusion, this paper tries to answer the questions below:

1. What is the association between dual innovation and enterprise innovation role?
2. What is the association between dual innovation and knowledge sharing?
3. What is the association between knowledge sharing and enterprise innovation role?
4. Does knowledge sharing exert a mediating effect on the association between dual innovation and innovation role of Chinese electronic information manufacturing enterprises?

The innovations of this article are as follows:

1. Using empirical evidence to supplement the gaps in previous research. Although previous studies on dual innovation have proposed the influence of dual innovation on innovation role, there have been few empirical studies;
2. In terms of knowledge management theory, it opens up the black box of the influence of dual innovation on innovation role. It reveals the importance of knowledge sharing mechanisms in Chinese electronic information manufacturing enterprises;
3. The application of dual innovation models in Chinese electronic information manufacturing enterprises focuses on the dual orientation of innovation strategies, providing a new path for innovation integration for Chinese electronic information manufacturing enterprises.

2. Theoretical Basis and Research Hypothesis

2.1. Dual Innovation and Innovation Performance

Ever since March introduced the idea of exploratory and exploitative learning, it has become a popular concept in various fields such as technological innovation, competitive advantage, organisational adaptation, and leadership. Exploratory innovation primarily involves the creation of novel knowledge and technology by businesses, as well as the establishment of innovative organisational management and the identification of new opportunities in terms of businesses, markets, processes, and more. This is achieved through the pursuit of new knowledge and technology to cater to emerging customer needs and future market demands (Kollmann & Stöckmann, 2014). Exploitative innovation refers to the utilisation and advancement of existing knowledge and technology by companies (March, 1991). Enterprises can effectively allocate, coordinate, and integrate their resources to meet client and market demands by improving their existing knowledge and technology (Benner & Tushman, 2003). Assessing innovation performance provides a holistic measure of the results achieved through corporate innovation efforts, encompassing both qualitative and quantitative factors. It covers two essential viewpoints. Firstly, when it comes to innovation outcomes, it involves the creation of new ideas, the unique features found in products, their ability to meet market demands, and the overall progress in technological capabilities (Lovelace, Shapiro, & Weingart, 2001). Furthermore, when it comes to the product, it encompasses the culmination of innovative endeavours, encompassing both the end result and the intricate process that intertwines scientific principles and market demands (McDermott & Prajogo, 2012).

This article discusses how innovation performance is measured by the transformative impact of innovative activities within an enterprise. The dimensions mentioned in the study by Lovelace et al. (2001) include factors such as the speed at which new products and services are introduced to the market, the number and quality of patents obtained, the ability to develop innovative offerings, the degree of success in launching new products and services, and the overall impact of these new offerings on total sales. By examining innovation performance from various perspectives, organisations can gain valuable insights into the effectiveness of their innovation strategies and investments, as well as their competitiveness in the market. Therefore, thoroughly examining and striving for excellence in innovation across these pillars are crucial for making a valuable contribution to sustainable growth in fiercely competitive business environments.

Exploratory innovation aims to develop knowledge and technology that have never been used by enterprises before, and seeks new knowledge and technology to meet emerging customer or future market demands (Kollmann & Stöckmann, 2014). The core driving force chain for enterprises to carry out exploratory innovation is to seek for changes, and to provide sufficient motivation for achieving new goals through the upgrading of knowledge and technology. Carrying out exploratory innovation can accelerate the innovation speed and quality of new goods or services of enterprises, enhance the success rate of new goods or services entering the market, and make it difficult for competitors to imitate, so enterprises can form first-mover advantage (Ozer & Zhang, 2015). Therefore, this paper proposes H1a hypothesis: exploratory innovation may significantly positively influence innovation performance. Academic research suggests that exploitative innovation leverages existing knowledge and technology to effectively allocate resources, coordinate activities, and integrate its own capabilities. This approach aims to enhance existing knowledge and technology, enabling faster response to the needs of loyal customers and established markets. Exploitative innovation focuses on advancing and improving current products, services, and business models. It places importance on redeveloping existing knowledge and technology to better serve existing clients and markets. Academic research emphasises the importance of prior knowledge and technology in driving product expansion and improvement. This approach can lead to higher returns by leveraging the learning curve, outpacing competitors in launching new products, and achieving economies of scale or scope (Mueller, Rosenbusch, & Bausch, 2013). Therefore, this article proposes the H1b hypothesis: explorative innovation may significantly positively influence innovation performance.

2.2. Dual Innovation and Knowledge Sharing

The concept of knowledge sharing lacks a clear and uniform definition, primarily because of varying research perspectives. Many experts consider knowledge sharing to be a mindset or skill that involves the willingness to share knowledge (Amit Aharon, Ruban, & Dubovi, 2021). During the process of knowledge sharing, the provider offers support to help the receiver comprehend, absorb, and apply the knowledge effectively (Senge, 1990). Sharing knowledge involves effective communication between those providing and seeking information, facilitating the transfer and transformation of knowledge. Exploratory innovation pushes beyond the limits of an organisation, strategically gathering knowledge from both internal and external sources to position the enterprise as a knowledge-driven entity. This knowledge is gradually integrated into the enterprise's core strengths, bolstering its ability to innovate and spreading the resulting achievements to the wider market. Exploratory innovation emphasises the pursuit of new knowledge, aiming to achieve breakthroughs and long-term growth through innovation. It seeks to challenge the existing knowledge base of the company and avoid the pitfalls of over-reliance (Benner & Tushman, 2003). Exploratory innovation facilitates the expansion of customer base and market reach, enables the adoption of new knowledge and technology for innovative endeavours, and fosters the growth and diversification of knowledge and technology within the organisation (McCarthy, Collard, & Johnson, 2017). Thus, this article presents the H2a assumption: exploratory innovation can have a significant impact on knowledge sharing.

Unlike exploratory innovation, exploitative innovation is a more incremental and methodical approach to innovation. In order to successfully conduct innovative activities, it is essential to utilise various types of knowledge and effectively organise, integrate, and implement this knowledge at the organisational level. Enterprises have the opportunity to broaden their

knowledge and technology, enhance the design of current products, improve customer satisfaction, offer superior products and services, and establish a strong presence in the market through exploitative innovation (Benner & Tushman, 2003). In the exploitative innovation structure, enterprises are encouraged to prioritise the redevelopment and utilisation of existing knowledge. This involves using updates to existing knowledge to improve existing products and fostering the ability to share this knowledge within the company. Therefore, this article proposes the H2b hypothesis: exploitative innovation may significantly influence knowledge sharing.

2.3. Knowledge Sharing and Innovation Performance

In a dynamic and collaborative setting, team members within an organisation actively engage in sharing knowledge. This includes fostering research and development partnerships and engaging in co-creation activities across different departments. These practices contribute to the formation of a robust network for knowledge sharing that spans individuals and departments. In the context of knowledge sharing, the enterprise plays a crucial role as the primary entity for sharing knowledge. Knowledge is transferred and learned within the internal nodes and the network formed by these nodes, and eventually applied at each individual node. This method of knowledge sharing and transfer is based on the objectives of the organisation, which is advantageous for developing new products and innovating business models, thereby strengthening the organization's role in innovation (Tsai, 2009). Sharing knowledge can broaden the range of knowledge within a company, leading to more frequent exchanges of information. This, in turn, enhances the company's ability to conduct research and development, and speeds up innovation activities. It also shortens the time it takes to develop new products and impacts the overall innovation capabilities of the company (Paavo & Blomqvist, 2006). Therefore, this article proposes H3 hypothesis: knowledge sharing may significantly influence innovation performance.

2.4. The Mediating Effect of Knowledge Sharing

Exploratory innovation refers to innovative activities that are grounded in new knowledge and technologies. The organisation enhances its performance by seeking new knowledge and technologies to meet emerging customer or future market needs (Kollmann & Stöckmann, 2014). Exploratory innovation involves strategically acquiring knowledge from both internal and external sources, sharing it within the organisation, continuously acquiring and utilising new knowledge, gradually aligning and integrating it with the core competitiveness of the enterprise, and ultimately translating innovation achievements into innovation performance.

Therefore, this article proposes hypothesis H4a: knowledge sharing may mediates the association between exploratory innovation and innovation role.

Exploitative innovation builds upon existing knowledge, using it as a foundation for development. It allows for the evolution of this knowledge and transforms it into commercial value, meeting the needs of customers and the market. When it comes to transforming existing knowledge, exploitative innovation focuses on the benefits it brings, such as improving quality, reducing costs, and increasing productivity (Baer & Frese, 2003). To enhance their knowledge system, enterprises should ensure easy access to knowledge for all departments. This will help recipients understand, absorb, and apply knowledge to address issues related to innovation performance within the company.

Therefore, this article proposes hypothesis H4b: knowledge sharing may mediate the association between exploitative innovation and innovation performance.

On basis of the above theoretical review, this study proposes a theoretical model (as displayed in Figure 1).

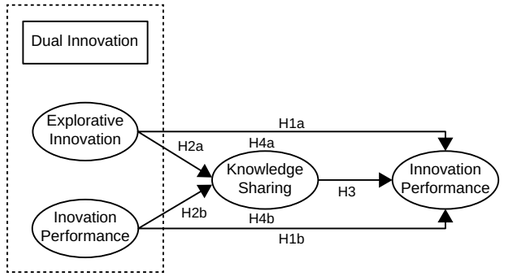

Figure 1: Theoretical Model.

3. Research Methods

3.1. Study Sample

This study suggests that smaller electronic information manufacturing companies may face challenges in balancing exploratory innovation and exploitative innovation due to limited resources. Thus, in the case of electronic information manufacturing companies, there is a requirement for a minimum of 100 employees and a total asset size of at least 5 million. The survey respondents were selected from senior managers who have a comprehensive understanding of the enterprise, in consideration of the limitations of the research questions. A total of 500 questionnaires were sent out via email, and 473 were received, resulting in a questionnaire recovery rate of 94.6%. A total of 52 questionnaires with empty or missing answers were excluded from the analysis. This resulted in a final sample size of 421 valid questionnaires, corresponding to a recovery rate of 84.2%. The descriptive statistics of the surveyed enterprises are as follows: The proportion of enterprises established for less than 3 years is 1.9% (n=8) of the sample size. The proportion of enterprises established for 3-5 years is 9.264% (n=39) of the sample size. The proportion of companies established for 6-10 years is 26.841% (n=113) of the sample size. A total of 136 enterprises, representing 32.304% of the sample size, have been established for 11-15 years. Additionally, there are 125 enterprises, accounting for 29.691% of the sample size, that have been established for more than 15 years. The distribution of property rights in this context is as follows: there are 63 state-owned companies, accounting for 14.964% of the total, and 307 private companies, accounting for 72.922%; there are 42 joint ventures, accounting for 9.976% of the total. Additionally, there are 8 foreign-funded enterprises, accounting for 1.9% of the total. Lastly, there is 1 other type of enterprise, accounting for 0.238% of the total. The distribution of employee size in the surveyed enterprises is as follows: 32.304% of the enterprises have 100-200 staff, 30.879% have 201-300 staff, 13.064% have 301-500 staff, and 23.753% have more than 500 staff.

3.2. Variable Measurement

This article has modified the item statements of existing scales by consulting scholars and business managers and considering previous research results. The aim is to improve the reflection of the research content in the final scale, based on mature scales that already exist. The Likert 5-point scale is commonly employed for measurement purposes (1 represents very inconsistent-5 represents completely consistent). The innovation performance scale consists of 5 items, based on the research conducted by Lovelace et al. (2001) and Cai & Dang. The dual innovation scale consists of 8 items, based on the research conducted by Jansen, Van den Bosch and Volberda (2005) and He and Wong (2004). It includes 4 items related to exploratory innovation and 4 items related to exploitative innovation. The knowledge sharing scale consists of 5 items, based on the findings of Lee (2001) and Huang (2009). The control variables include the establishment year, enterprise nature, enterprise size, and employee size.

4. Empirical Analysis and Results

4.1. Reliability and Validity Analysis

Table 1 displays the reliability and validity assessments of the primary variables. The Cronbach's α coefficients for exploratory innovation, exploitative innovation, knowledge sharing, and innovation role are 0.915, 0.935, 0.892, and 0.843, respectively. All of these coefficients exceed the threshold of 0.7, indicating a high level of reliability. The KMO values for exploratory innovation, exploitative innovation, knowledge sharing, and innovation role are all above 0.7 (0.768, 0.779, 0.893, and 0.790, respectively). Additionally, the Bartlett's test of sphericity indicates good validity for each scale, with a p-value of less than 0.001.

Table 1: Reliability and Validity Test Outcomes.

Variables	Cronbach's α	KMO	Bartlett's Test of Sphericity Shows p
Exploratory innovation	0.915	0.768	0.000<0.001
Exploitative innovation	0.935	0.779	0.000<0.001
Knowledge sharing	0.892	0.893	0.000<0.001
Innovation performance	0.843	0.790	0.000<0.001

4.2. Correlation Analysis

Table 2 displays the results of the Pearson correlation analysis for the primary variables. Significant positive correlations were observed between exploratory innovation and exploitative innovation (r=0.26, p<0.001), exploratory innovation and knowledge sharing (r=0.39, p<0.001), and exploratory innovation and innovation performance (r=0.35, p<0.001). Exploitative innovation showed strong positive correlations with knowledge sharing (r=0.44, p<0.001) and innovation role (r=0.36, p<0.001). Furthermore, there was a significant positive correlation between knowledge sharing and innovation role (r=0.61, p<0.001). The findings emphasise the interconnections between variables in the study's framework, highlighting the significance of exploratory and exploitative innovation, as well as knowledge sharing, in influencing innovation performance and roles.

Table 2: Average, Standard Deviation and Relationship Parameter of Variables.

Variables	Mean	St.D	1	2	3	4	5	6	7	8
1 Year of establishment	3.79	1,03	1.00							
2 Nature of property	2.00	0.59	-0.56	1.00						
3 Enterprise size	2.48	0.95	0.45**	-0.07	1.00					
4 Employee size	2.28	1.15	0.49**	-0.13**	0.51**	1.00				
5 exploratory innovation	3.38	0.92	-0.94	0.04	0.01	-0.03	1.00			
6 exploitative innovation	3.03	1.14	0.06	0.01	0.03	0.07	0.26***	1.00		
7 knowledge sharing	3.59	1.30	0.12	0.03	-0.06	-0.02	0.39***	0.44***	1.00	
8 innovation performance	3.27	0.85	-0.04	0.09	-0.07	-0.06	0.35***	0.36***	0.61***	1.00
Note: * stands for p<0.05; ** means p<0.01; *** refers to p<0.001.										

4.3. Hypothesis Testing

(1) The direct influence of dual innovation on innovation performance

Regression model 2, as shown in Table 3, has an adjusted R^2 value of 0.13, suggesting that exploratory innovation explains more than 10% of the variation in innovation performance. The F-test value of 11.18 is significant at the 0.001 level, indicating that the model is valid. The coefficient for the impact of exploratory innovation on innovation role is 0.33 ($p < 0.001$). The results confirm that exploratory innovation has a significant and positive impact on innovation performance, thus supporting hypothesis H1a. Organisations that promote exploratory innovation are likely to experience improved innovation performance. The study emphasises the importance of exploratory innovation in driving innovation outcomes and roles within organisations. It highlights how this type of innovation is crucial for organisational success and competitiveness in dynamic environments.

In regression model 3, the adjusted R^2 value of 0.17 indicates that exploitative innovation plays a significant role in explaining a portion of the variance in innovation performance. The F-test value, which changes by 11.99 and is significant at the 0.001 level, confirms the overall significance of the model. The coefficient for exploitative innovation's impact on innovation performance is 0.37, indicating a significant relationship between the two variables. The findings of this study support hypothesis H1b, suggesting that exploitative innovation has a significant and positive impact on innovation performance. This highlights the significance of utilising exploitative innovation strategies to improve innovation outcomes and achieve organisational success. Through the strategic utilisation of available knowledge and resources, companies can enhance their innovation performance and sustain their competitiveness in rapidly changing markets.

Table 3: Hypothesis Testing Results of Exploitative Innovation and Exploratory Innovation on Innovation Role.

	Performance Innovation		
	Model 1	Model 2	Model 3
Control Variables			
Year of establishment	-0.01	0.06	-0.02
Nature of property	0.08	0.06	0.07
Enterprise size	-0.05	0.36	-0.04
Employee size	-0.02	-.07	-0.05
Independent Variable			
Exploratory innovation		0.33***	
Exploitative innovation			0.37***
R^2	0.02	0.43	0.15
Adj-R^2	0.12	0.13	0.17
F value	1.249	11.18***	11.99***
Note: * means p<0.05; ** stands for p<0.01; *** refers to p<0.001.			

(2) The Direct Impact of Dual Innovation on Knowledge Sharing

Table 4 displays the results of regression model 2. The adjusted R^2 value is 0.17, indicating that exploratory innovation has a significant impact on knowledge sharing. The F-test value changes by 13.62, which is statistically significant at the 0.001 level, indicating that the regression model passes the F-test. The exploratory innovation has a significant impact coefficient of 0.40 on knowledge sharing, as indicated by a p-value of <0.001. The findings suggest that exploratory innovation has a significant positive impact on knowledge sharing. Thus, H2a has been confirmed.

Regression model 3 shows an adjusted R^2 of 0.20, indicating that exploitative innovation has a significant impact on knowledge sharing. The corresponding F-test value changes by 16.89, which is statistically significant at the 0.001 level, suggesting that the regression model passes the F-test. The exploitative innovation has a significant influence coefficient of 0.44 on knowledge sharing, as indicated by a p-value of <0.001. The analysis shows that exploitative innovation has a significant positive impact on knowledge sharing. Thus, H2b has been confirmed.

Table 4: Hypothesis Testing Results of Knowledge Sharing Through Exploratory and Exploitative Innovation.

	Knowledge Sharing		
	Model 1	Model 2	Model 3
Control Variables			
Year of establishment	0.05	0.09	0.03
Nature of property	0.02	0.01	0.01
Enterprise size	-0.08	-0.11	-0.01
Employee size	0.01	0.01	-0.03
Independent Variable			
Exploratory innovation		0.40***	
Exploitative innovation			0.44***
R^2	0.01	0.17	0.20
Adj-R^2	-0.01	0.15	0.19
F value	0.53	13.62***	16.89***
Note: * means p<0.05; ** refers to p<0.01; *** stands for p<0.001.			

The direct impact of knowledge sharing on innovation performance

Table 5 displays the results of regression model 2. The modified R^2 value is 0.38, indicating that knowledge sharing has a significant impact on innovation performance. The F-test value increases by 41.56, which is statistically significant at the 0.001 level, indicating that the regression model passes the F-test. The knowledge sharing influence coefficient on innovation role is 0.60 ($p < 0.001$). The findings suggest that knowledge sharing has a significant positive impact on innovation performance. Thus, H3 has been confirmed.

Table 5: Hypothesis Testing Results of Knowledge Sharing on Innovation Role.

	Innovation Performance	
	Model 1	Model 2
Control Variables		
Year of establishment	-0.01	-0.04
Nature of property	0.08	0.07
Enterprise size	-0.05	0.01
Employee size	-0.02	-0.02
Independent Variable		
Knowledge sharing		0.60***
R^2	0.02	0.38
Adj-R^2	0.01	0.37
F value	1.25	41.56***
Note: * means p<0.05; ** stands for p<0.01; *** refers to p<0.001.		

(3) The mediating effect of knowledge sharing on the direct impact

Table 6 demonstrates that regression model 2 incorporates the independent variable exploratory innovation and the mediating variable knowledge sharing in the regression equation. The standardised parameter for exploratory innovation and innovation role is 0.14 (p<0.001), indicating a decrease in the coefficient. The standardised coefficient for knowledge sharing is 0.55 (p<0.001). Thus, H4a has been confirmed.

Regression model 3 incorporates the independent variable exploitative innovation and the mediating variable knowledge sharing in its regression equation. The standardised parameter for exploitative innovation and innovation role is 0.13 (p<0.001), indicating a decrease in the coefficient. The standardised coefficient for knowledge sharing is 0.55 (p<0.001). Thus, H4b has been confirmed.

Table 6: Hypothesis Testing Results of the Mediating Effect of Knowledge Sharing.

	Innovation Performance		
	Model 1	Model 2	Model 3
Control Variables			
Year of establishment	-0.01	0.09	-0.04
Nature of property	0.08	0.01	0.07
Enterprise size	-0.05	-0.11	-0.01
Employee size	-0.02	0.01	-0.03
Independent Variable			
Exploratory innovation		0.14***	
Exploitative innovation			0.13***
Mediator Variable			
Knowledge sharing		0.55***	0.55***
R^2	0.02	0.39	0.40
Adj-R^2	0.01	0.38	0.39
F value	1.25	37.89***	34.51***
Note: * means p<0.05; ** refers to p<0.01; *** means p<0.001.			

The results of the Sobel test in Table 7 indicate mediation effects between exploratory innovation, exploitative innovation, knowledge sharing, and innovation performance. The results indicate that knowledge sharing has a significant mediating effect on innovation performance, as evidenced by the high Z value of 7.30 (p<0.001). The results indicate a significant mediation effect of knowledge sharing on innovation performance for exploitative innovation, as evidenced by a Z value of 8.98 (p<0.001). The findings support hypotheses H4a and H4b, indicating that knowledge sharing mediates the relationship between exploratory and exploitative innovation and

innovation performance. The significance of promoting knowledge-sharing mechanisms within organisations to improve the effectiveness of innovation strategies on overall performance is emphasised.

Table 7: Results of Sobel Test.

Variables	Z value	Std.Error	P-value
Exploratory Innovation	7.30	0.05	0.000
Exploitative Innovation	8.98	0.03	0.000

5. Conclusion and Implications

5.1. Research conclusions

This article examines the relationship between dual innovation, innovation performance, and knowledge sharing as an intermediary variable. The conceptual model of dual innovation on innovation performance is verified through reliability and validity analysis, correlation analysis, regression analysis, and Sobel test. All hypotheses are confirmed. The subsequent discussion is based on the verification results.

(1) Dual innovation significantly enhances innovation performance in terms of both level and scope. Exploratory innovation, which involves acquiring new external knowledge and developing new technology through innovative methods, serves as a catalyst for innovation. Organisations can promote innovation and adapt to changing client demands by adopting experimental strategies. This enables them to develop new products, services, or business models and overcome technological obstacles, leading to long-term success. Exploitative innovation focuses on improving quality, reducing costs, and enhancing efficiency to make processes more efficient and productive. Innovative products and services that are introduced with little advance notice contribute to short-term growth in innovation performance. Exploratory and exploitative innovation are both essential but have distinct roles in optimising innovation performance. The exploratory type of innovation fosters creativity and enables organisations to discover new markets and opportunities. Meanwhile, the type of innovation focused on optimising existing processes aims to increase competitiveness and efficiency. These dual innovation strategies enable organisations to successfully navigate dynamic environments and adapt to change, ensuring a consistent commitment to innovation excellence. This ensures that there are no barriers to future development and staying relevant in the face of market challenges and technological advancements.

(2) Dual innovation plays a crucial role in enhancing knowledge sharing within electronic information enterprises in China. As a driving force for the advancement of innovation performance, it not only fosters the growth of enterprise knowledge in innovation, but also elevates the overall level of innovative performance. Organisations can combine exploratory innovation and exploitative innovation to refine their innovation strategies and enhance the effectiveness of their innovation efforts. Exploratory innovation seeks out fresh sources of external knowledge to enhance technology through inventive methods, facilitating the development of novel markets, technologies, and business models. This fosters the acquisition of diverse sources of knowledge and cultivates an environment that encourages collaboration and knowledge sharing, both within and beyond organisational boundaries.

Exploitative innovation primarily focuses on refining existing knowledge and techniques, resulting in improved quality, reduced costs, and increased efficiency. By leveraging existing resources and strengths, organisations can capitalise on opportunities for gradual enhancement. This can result in immediate performance gains and establish a solid foundation for long-term growth. By simultaneously employing exploration and exploitation innovation approaches, organisations can establish a distinct innovation ecosystem that fosters knowledge sharing, collaboration, and continuous learning. This not only enhances the innovation capacity of companies but also prepares them for long-term success and competitiveness in unpredictable and dynamic markets.

(3) Sharing knowledge plays a crucial role in both fostering innovation and enhancing performance. This transition connects the principles of innovation duality with the results of innovation performance, thereby establishing a foundation for ongoing improvement. By fostering a culture of knowledge sharing, organisations can tap into the power of combining exploratory and exploitative innovation approaches. This allows them to unlock their full innovation potential and drive performance growth. The sharing and dissemination of knowledge, wisdom, and best practices enable organisations to enhance their ability to innovate and adapt, thus positioning themselves for long-term success in a constantly evolving and fiercely competitive business landscape. Hence, the act of sharing knowledge facilitates the integration of both innovative ideas into tangible outcomes, playing a crucial role in the sustained success and competitiveness of businesses.

5.2. Research Implications

(1) It is crucial for Chinese electronic information manufacturing companies to prioritise investment in innovation and enhance the effectiveness of their innovation processes. Chinese electronic information manufacturing enterprises are considered high-tech enterprises. Thus, technological advancement serves as the primary catalyst for innovation. Discovering knowledge through innovation is the key to achieving technological advancements. Embracing a dual innovation approach is crucial for electronic information manufacturing enterprises to enhance their innovative performance. This approach involves acquiring both internal and external knowledge, making it the preferred model for driving innovation.

(2) Therefore, the electronic information manufacturing industry, which strives to promote economic growth through enhanced quality, encounters significant challenges of utmost importance. Innovation is crucial for industries to maintain their competitiveness and foster growth. Industry associations are crucial in developing the innovation ecosystem to address these challenges. They facilitate the development of industrial groups and foster effective communication channels among enterprises. Collaboration and knowledge sharing facilitate the formation of networks where different individuals come together to share and introduce various technologies. They play a crucial role in transmitting and spreading innovation results, enhancing the culture of teamwork and collaboration. Therefore, it is the fundamental element upon which the innovation ecosystem in the electronic information manufacturing industry is constructed. Thus, competition among industries is fostered, leading to the development of an optimal industry structure that is crucial for long-term growth and innovation. These activities allow the sector to quickly adapt to market developments and emerging technologies, which greatly enhances its competitiveness in the global market.

(3) The government departments play a vital role in fostering innovation within the electronic information manufacturing industry of China. As a result, decision makers must prioritise innovation performance. It is important for individuals in this field to address challenges related to innovation and assist businesses in building robust innovation systems. It involves creating frameworks and tools that incentivize and support innovative ideas and projects. Departmental assistance can be a catalyst for companies to invest in research and development, leading to advancements in technology and industrial growth. Furthermore, the government's initiatives can foster collaboration among industry players, research firms, and academia, creating an environment conducive to knowledge-sharing and collaboration. Governments have the potential to foster innovation by implementing incentive programmes and supportive policies. These measures can create an environment that encourages risk-taking and experimentation, both of which are crucial for driving the innovation process. In addition, government departments can support and encourage innovation by providing funding, offering tax breaks, and implementing regulations that promote research and development investments and innovative activities. By focusing on industry requirements and priorities, government regulatory bodies can support the growth of the innovative electronic manufacturing sector. This, in turn, will help drive economic growth and enhance competitiveness at both the national and global levels.

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