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AN IN-DEPTH ANALYSIS OF ECO-FRIENDLY RESOURCES AND THEIR EFFECTS ON BUSINESS OUTCOMES

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Abstract: This study delves into the concept of green input, which pertains to enterprises proactively investing in innovations aimed at mitigating environmental impact and integrating environmental responsibility into their strategic plans. While foreign scholars have extensively explored green input, their research primarily spans four key domains: environmental economics, innovation economics, strategic management, and industrial organization. In the realm of environmental economics, the research centers on the influence of environmental regulations on firms' competitiveness and how various regulatory tools affect firms' innovative actions. Innovation economics employs general innovation theories to dissect the drivers and mechanisms underpinning enterprises' green input behaviors. The strategic management perspective investigates the effects and mechanisms of green investment strategies on firms' competitive advantages. Finally, from the standpoint of industrial organization, this study explores how firm size and collaboration impact green investment behavior. Table 1 presents a comparative overview of green input research across these four distinctive perspectives.

Keywords: Green input, Environmental economics, Innovation economics, Strategic management, Industrial organization.

Research on Green Investment

1.1. Research status of Green Investment

Existing studies on the connotation of green input can be summarized as the innovation input paid by enterprises to proactively reduce the negative impact on the environment and incorporate environmental responsibility into strategic planning [1].Foreign scholars' research on green input is relatively mature, and the research perspectives mainly focus on four aspects: environmental economics, innovation economics, strategic management, and industrial organization. From four perspectives, green input research focuses on different green input issues: Environmental economics mainly focuses on the impact of environmental regulation on firms' competitiveness and the impact of different regulatory tools on firms' innovation behavior. Innovation economics uses the general innovation theory to discuss the driving factors and mechanisms of green input behavior of enterprises. From the perspective of strategic management, it explores the effect and mechanism of green investment strategy on the competitive advantage of enterprises. From the perspective of industrial organization, the influence of firm scale and firm collaboration on green investment behavior is investigated. Table 1 compares the green input studies from four different perspectives:

Table 1: Comparison of green investment research from four perspectives

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Research perspective	Analysis level	Research topic	research method
environmental economics	Industry, organization	The Impact of Environmental Regulation on Enterprise Competitiveness and Green Investment Behavior	Qualitative case studies
Innovation Economics	organization	The driving factors and mechanisms of green investment in enterprises	Qualitative research
strategic management	organization	The Impact of Green Investment on Competitive Advantage of Enterprises	Questionnaire research
Industrial organization	Industry, organization	The Impact of Market Structure on Enterprise Green Investment	Questionnaire research

1.2. Drivers of Green Investment

1.2.1. The Impact of External Environment on Green Investment of Enterprises

The research perspective of external environment is mainly based on stakeholder theory and institutional theory to analyze the influencing factors of green input. According to the existing research results, the personality characteristics and cognitive structure of the internal managers and stakeholders can directly affect the green investment of the enterprise, and they have a positive regulating effect on the green investment of the enterprise. Buysse et al. found that stakeholders such as shareholders, employees and economic institutions played a major role in the process of enterprises adopting leading environmental protection strategies [2]. Delgado-Ceballos et al. further expanded the study of stakeholder theory and found that if enterprises have stronger stakeholder integration ability, they will better develop positive environmental strategies [3]. Lin et al. found that environmental regulations and different stakeholders such as suppliers, customers and competitors would have different degrees of influence on enterprises' green input activities [4]. Based on the new system theory, Li Yina et al. divided regulatory pressure into mandatory environmental laws and regulations and incentive environmental laws and regulations, and paid attention to the influence of competitor pressure and customer pressure. The results show that mandatory regulation and competitor pressure can effectively promote enterprises to implement green input activities and strengthen environmental protection practices [5]. There are different arguments about the impact of environmental regulation on green input. Among the research results of Chinese scholars, most agree that environmental regulation has a positive impact on green input of enterprises, while some scholars believe that environmental regulation has a negative impact on green input. For example, some scholars have found that compared with command-type environmental regulation policies, incentive environmental regulation policies have a more positive impact on green innovation input, and some scholars believe that there is no significant correlation between the two. In conclusion, stakeholder pressure and environmental regulation from the external environment are the main driving factors of green input.

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1.2.2. The Impact of Internal Conditions on Enterprise Green Investment

The internal conditions of enterprises will also affect the green input of enterprises. The research perspective is mainly based on the theory of natural resources. Ketata et al. found that internal absorptive capacity plays an important driving role in enterprises' investment in sustainable innovation [6]. Lin et al. focus on internal knowledge resources and capabilities of enterprises and find that green knowledge sharing improves green dynamic capabilities, further promotes enterprises to increase green investment, implement green service innovation and obtain green competitive advantages [7]. Chen et al. compared reactive and proactive green innovation behaviors and found that only internal conditions such as environmental leadership, culture and ability could promote proactive green innovation strategies [8]. By distinguishing the driving factors of innovation, Horbach et al. believe that technology, knowledge, infrastructure, information and other resources owned by enterprises have a positive driving effect on green innovation [9]. Therefore, factors such as background characteristics, capability and resources are the internal driving forces of green innovation investment of enterprises. Figure 1 shows a framework of green input drivers.

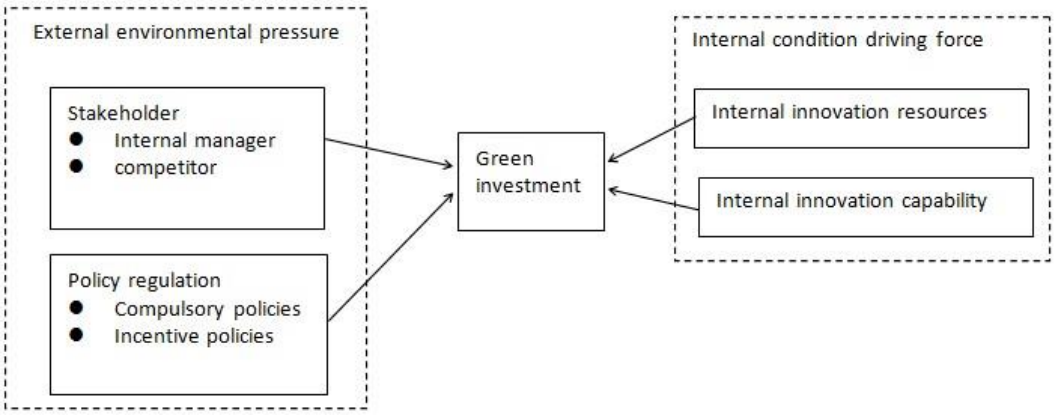

Figure 1: Framework Diagram of Green Input Drivers

1. Research on Enterprise Performance

Enterprise performance refers to the operating benefits brought to the enterprise by using limited resources to carry out business activities. Operating efficiency is mainly manifested in four aspects, including profitability, asset operation ability, debt paying ability and development ability. Enterprise performance can be comprehensively evaluated by examining the above four aspects.

Research on enterprise performance has always been a hot topic, and relevant research results are mainly summarized in three aspects, namely theoretical research on enterprise performance, evaluation method research and influencing factors research. The theoretical research of business performance mainly focuses on the connotation, extension and different theoretical research perspectives of business performance. Research theories involve a variety of disciplines such as economics, management, accounting, statistics, etc. Various disciplines penetrate each other to promote the continuous development of research on enterprise performance. The research of enterprise performance evaluation method is an important aspect of enterprise performance research. Among the existing theoretical achievements, the foreign performance evaluation methods mainly include Wall comprehensive evaluation method, Dupont analysis model, economic value added, market value added, revised

economic value added and so on. These methods meet the needs of enterprise performance evaluation in different periods and stages, covering a variety of modes such as financial mode and strategic mode. The innovation and application of the above performance methods greatly promote the improvement of enterprise performance and the development of enterprise capability. The research on the influencing factors of business performance is also a hot topic in the research of business performance. Enterprise performance is affected by a variety of factors, and these factors cross each other and ultimately determine the level of enterprise performance. The research focuses on innovation and entrepreneurship, senior management team, diversified business strategy, and regional differences.

Among them, in the field of innovation and firm performance, Zhongqingyang Huiming Zhu through based on resource-based theory and Schumpeter's innovation theory, the study found that in the practice of circular economy under the background of small and medium-sized enterprises, enterprise development is positively related to patent and sustainable performance [10]. Jedsada Wongsansukcharoen, located in the eastern part of Thailand economy corridor Jutamard Thaweepaiboonwong examined 260 mses, found that human resource practice innovation, innovation ability and competition advantage and there is a significant relation between small and medium-sized enterprise performance [11]. Yongzhang Penga, Changqi Tao using relevant data of listed companies in 2012-2020, reveals the enterprise in the process of digital transformation, by reducing the cost and increase revenue, improve efficiency, encourage innovation to promote the development of enterprises, among them, the enterprise's innovation policy effect was most pronounced [12]. Peng-huaQIAO, Xiao-fengJU et al. found that innovation in invention has a significantly positive impact on enterprise performance beyond the influence of industry association network, which proves that innovation is a key factor for the survival, growth and development of Chinese smes [13].

2. Research on the Relationship between Green Investment and Enterprise Performance

For the research on the relationship between green input and enterprise performance, no matter foreign or domestic scholars, the conclusions are not uniform, and there are mainly two opposing views. One view holds that green input can help enterprises gain competitive advantages and bring economic benefits, that is, there is a positive correlation between green input and corporate performance. Another view holds that enterprises will encounter obstacles when carrying out green input activities, which will increase the cost burden of enterprises, make enterprises unable to get returns in the short term and reduce economic benefits, namely, negative correlation. In addition, some scholars believe that there is an uncertain relationship between green input and enterprise performance. The reason for many conclusions may be the inconsistent consideration of time by scholars and the inconsistent measurement of variable indicators. Foreign scholars often use indicators such as green R&D expenditure or green patent when measuring green investment, while domestic scholars mainly obtain relevant data through questionnaires. In the selection of enterprise performance measurement indicators, there are also a variety of options, including return on total assets, profit rate of main business, Tobin's q value and enterprise production efficiency, which lead to inconsistent research conclusions.

3.1. Research on Positive Correlation

Many scholars have conducted in-depth and detailed studies on the relationship between green input and corporate performance, but the research results are not uniform. Most scholars believe that green input can promote corporate performance, and there is a positive correlation between the two.The positive effect of green input on

enterprise performance starts from "Porter hypothesis", which holds that appropriate technical design of green input procedures can reduce organizational inertia under environmental regulations, thus promoting technological innovation of enterprises, strengthening work and production efficiency of enterprises, and improving corporate earnings and performance. Porter, Hart and other scholars conducted earlier studies on the relationship between environment and corporate performance and found that environmental behavior has a positive effect on corporate performance. Hart points out that natural environment, pollution control, product management and sustainable development will be the source of competitive advantage. Junaid Muhammad Zhang Qingyu etc. Based on the information processing theory and dynamic capability view, put forward a relevant sustainable supply chain integration, the framework of green innovation and enterprise performance, collecting Pakistan 19 different industry data from 296 manufacturing enterprises for research, The research results show that green management innovation has a significant positive impact on corporate financial performance [14]. Somjai Sudawan and Fongtanakit Ratchada selection of Indonesia's multinational companies as the research object, using the PLS - SEM model, the results confirmed that the green innovation inputs and environmental management accounting to the enterprise financial performance has significant and positive effect, It is confirmed that green innovation input is a contributor to corporate performance [15].

Many domestic scholars believe that there is a positive correlation between green input and enterprise performance. LiangHanyuan, Li Guangliang etc. Based on the Shanghai and Shenzhen A-share listed manufacturing companies in 2011-2019 panel data, the empirical study shows that the performance of green innovation can help companies to ascend, and consider the regulating effect of fiscal subsidies and tax breaks, the result shows that both can strengthen green innovation and the relationship between the corporate performance, When the two policies are in parallel, the incentive effect of tax incentives is more obvious [16]. ZhangMin and SuYu Based on the data of listed companies in China's high carbon industry from 2000 to 2021, Zhu Peng found that green innovation has a significant promoting effect on corporate performance. Further heterogeneity analysis showed that high-quality green innovation can better promote the improvement of corporate performance. In companies with a higher proportion of equity, green innovation plays a greater role in promoting corporate performance [17]. In addition, some scholars consider the lag effect and believe that the positive impact of green input on enterprise performance is delayed. Xuemei Xie and Yuhang Han used the data of 172 Chinese manufacturing enterprises (including 104 state-owned and 68 non-state-owned manufacturing enterprises) to study the impact of green process innovation on environment and financial performance. The results showed that although green process innovation did not significantly improve the financial performance of enterprises in the short term, further analysis showed that, Green technology innovation, which lags behind for three years, does have a positive impact on the financial performance of enterprises [18]. The research results of these scholars all show that green input of enterprises has a certain promoting effect on enterprise performance. When the lag effect is taken into account, green input will also improve enterprise performance in the long run.

3.2. Research on Negative Correlation

Foreign scholars have put forward the negative correlation between green input and enterprise performance earlier, and the representative school is the neoclassical economic school. Neoclassical economics believes that the government's environmental regulation policies will force enterprises to bear certain environmental pollution control costs, which will increase the production costs of enterprises and reduce their marginal profits. In addition,

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the green development mode requires enterprises to change the existing technology. The investment in green innovation of enterprises will squeeze out productive investment and profitable investment funds, which will reduce the productivity and profit rate of enterprises and hinder the improvement of enterprise performance. MuhammadJunaida and Qingyu Zhang et al. based on primary and secondary survey data from the annual reports of 296 manufacturing enterprises in Pakistan, found that sustainable internal, supplier and customer integration promotes green process innovation, and green process innovation has a significant negative impact on enterprise performance. This indicates that rapid changes in manufacturing processes and operating procedures bring costs to enterprises in various ways and reduce their profits [14]. Ivanka & Frank studied manufacturing enterprises and found that green innovation would cause long-term knowledge loss of enterprises and thus reduce enterprise performance.

3.3 Other Relationship Studies

In the process of research, some scholars have found that there is no correlation or other relationship between green investment and enterprise performance. Loth and Marin measured green innovation according to the patent application data of enterprises. The research showed that the improvement of production efficiency brought by green innovation was lower than that brought by non-green innovation. Therefore, it was believed that green innovation had no significant positive impact on enterprise productivity and had a crowding out effect on other innovations with stronger profitability [19]. Xu Jianzhong studied the U-shaped relationship between green innovation and enterprise performance from the perspective of complementary assets [20]. Research on the relationship between green innovation and firm performance in different environments will produce different conclusions. Liu Linyan and Song Hua took China and the United States as the background and found that there is an "inverted U-shaped" relationship between green innovation behavior and performance of American enterprises, but this relationship is not valid for Chinese enterprises [21]. The framework diagram of existing conclusions on the relationship between green input and enterprise performance is shown in the figure 2 below [22-23]:

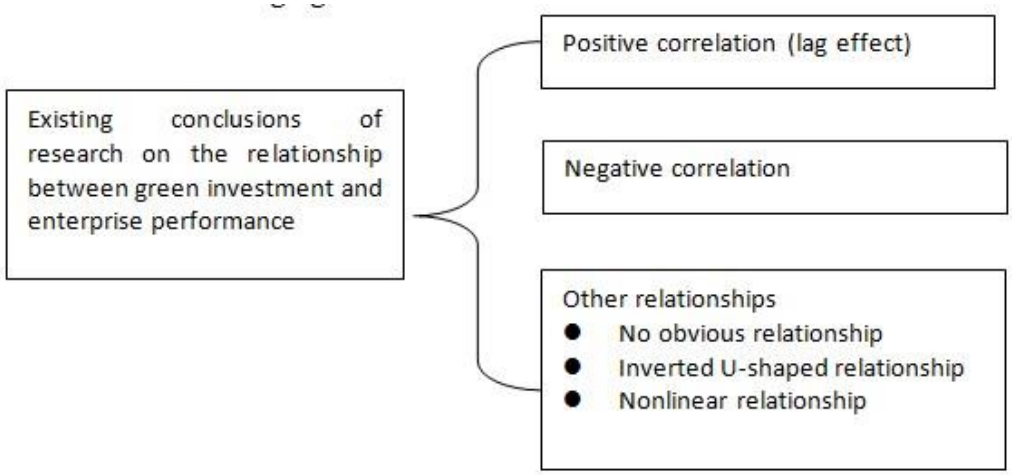

Figure 2: Framework of existing conclusions on the relationship between green investment and enterprise performance

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3. Conclusion

Based on the above literature review, it can be found that green investment by enterprises contributes to achieving the strategic goals of sustainable development of enterprises, and its value is reflected in the balance between economy, resources, and environmental protection. On the one hand, enterprises need to realize that at a time when ecological protection issues are deeply rooted in the hearts of the people, enterprises should establish environmental protection awareness, increase their green investment, and promote their own green transformation; On the other hand, enterprises should also know that green technology innovation can bring more economic performance in the long run, helping enterprises to occupy a favorable position in fierce competition. Therefore, according to their own research and development capabilities, enterprises can take positive environmental strategies and actively carry out green technology innovation activities, which is of great benefit to their long-term development.

References

Eiadat, Y., Kelly, A., Roche, F. Green and Competitive? An Empirical Test ofthe Mediating Role of Environmental Innovation Strategy. Journal of World Business, 2008, 43(2): 131-145.

Buysse, K., Verbeke, A. Proactive Environmental Strategies: A Stakeholder Management Perspective. Strategic Management Journal, 2003, 24(5): 453-470.

Delgado-Ceballos, J., Aragón-Correa, J.A., Mandojana, N. The Effect of Internal Barriers on the Connection between Stakeholder Integration and Proactive Environmental Strategies. Journal of Business Ethics, 2012, 107(3): 281-293.

Lin, H., Zeng, S. X., Ma, H. Y. Can Political Capital Drive Corporate Green Innovation? Lessons from China. Journal of Cleaner Production, 2014, 64(3): 63-72.

Li Yefei. System pressure, green innovation practice and enterprise performance relationship-- based on the theory of new institutionalism and ecological modernization theory perspective, Science research, 2011, 29(12):1884-1894.

Ketata, I., Sofka, W., Grimpe, C. The Role of Internal Capabilities and Firms` Environment for Sustainable Innovation: Evidence for Germany. R&D Management, 2015, 45(1): 60-75.

Lin, Y. H., Chen, Y. S. Determinants of Green Competitive Advantage: The Roles of Green Knowledge Sharing, Green Dynamic Capabilities, and Green Service Innovation. Quality & Quantity, 2017, 51(4): 1663-1685.

Chen, Y. S., Chang, C. H., Wu, F. S. Origins of Green Innovations: The Differences between Proactive and Reactive Green Innovations. Management Decision, 2012, 50(3): 368-398.

Original Article

Horbach, J., Rammer, C., Rennings, K. Determinants of Eco-Innovations by Type of Environmental Impact: The Role of Regulatory Push/Pull, Technology Push and Market Pull. Ecological Economics, 2012, 78(6): 112-122.

Zhongqingyang Zhang, Huiming Zhu, Zhongbao Zhou, Kai Zou. How does innovation matter for sustainable performance? Evidence from small and medium-sized enterprises, Journal of Business Research, 2022, 153(12):251-265.

Jedsada Wongsansukcharoen, Jutamard Thaweepaiboonwong, Effect of innovations in human resource practices, innovation capabilities, and competitive advantage on small and medium enterprises' performance in Thailand, European Research on Management and Business Economics, 2023, 29(1):100210

Yongzhang Peng, Changqi Tao. Can digital transformation promote enterprise performance? —From the perspective of public policy and innovation, Journal of Innovation & Knowledge, 2022, 7(3): 100198

Penghua Qiao, Xiaofeng Ju, Henggan Feng, Industry association networks, innovations, and firm performance in Chinese small and medium-sized enterprises, China Economic Review, 2014, 29(23): 213-228.

Junaid Muhammad, Zhang Qingyu, Syed Muzzammil Wasim. Effects of sustainable supply chain integration on green innovation and firm performance. Sustainable Production and Consumption, 2022, 30: 145-157.

Somjai Sudawan, Fongtanakit Ratchada, Laosillapacharoen Khomsan. Impact of environmental commitment, environmental management accounting and green innovation on firm performance: an empirical investigation. International Journal of Energy Economics and Policy, 2020, 10(3):204-210.

Liang Hanyuan, Li Guangliang, Zhang Weikun, Chen Zhe. The Impact of Green Innovation on Enterprise Performance: The Regulatory Role of Government Grants. Sustainability, 2022, 14(20): 13550.

Zhang Min, Su Yu, Zhu Peng. Will Green Innovation Bring about the Financial Spillover Effect? Evidence from China's High-Carbon Listed Companies. Sustainability, 2022, 15(1):89.

Xuemei Xie, Yuhang Han. Can green process innovation improve both financial and environmental performance? The roles of TMT heterogeneity and ownership, Technological Forecasting and Social Change, 2022, 184(168):122018.

Marin, Giovanni, Lotti, et al. Productivity effects of eco-innovations using data on ecopatents. Industrial and Corporate Change, 2017, 26(1): 125-148.

Jianzhong Xu, Guan Jun, Lin Yan. Complementary assets perspective of green innovation and enterprise performance relationship research-- strategic flexibility and redundant organization adjustment. Science and technology, 2016, 33(20): 76-82.

Original Article

Linyan Liu, Song Hua. "Green" company ACTS on the enterprise performance?—based on a comparative study of the United States and China. Science and Technology Management, 2012, 33(2): 104-114.

Daradkeh, M. K. (2021). An Empirical Examination of the Relationship between Data Storytelling Competency and Business Performance: The Mediating Role of Decision-Making Quality. Journal of Organizational and End User Computing (JOEUC), 33(5), 42-73.

Pham, L. M., Tran, L. T., Thipwong, P., & Huang, W. T. (2019). Dynamic Capability and Organizational Performance: Is Social Networking Site a Missing Link? Journal of Organizational and End User Computing (JOUC), 31(2), 1-21.