Received : 14 Oct 2024 | Revised: 22 Dec 2024 | Accepted: 25 March 2025
DOI: 10.62460/IJEASS/2025.20

RESEARCHARTICLE

Interdisciplinary Journal of Emerging and Social Sciences

Catalyzing Green Success: How Innovation Transforms Ecological Incentives into Sustainable Project Performance

Saqib Altaf[1], Wenyuan Li[2], Nasira Altaf[3], Muhammad Kamran Siddiqui[4] and Muhammad Shahbaz[5]

[1]School of Management, Jiangsu University, Zhenjiang, P.R.China
[2]School of Management, Jiangsu University, Zhenjiang, P.R.China
[3]Department of Business Administration, Allama Iqbal Open University, Islamabad, Pakistan
[4]Business School, Birmingham City University, Birmingham, United Kingdom (UK)
[5]Department of Leadership and management Studies, National Defense University, Islamabad

Correspondence
liwenyuan8@ujs.edu.cn

Abstract
This research examines the impact of green financial and non-financial incentives on the green project—demonstration in the construction industry in Jiangsu province, China. It investigates the role of mediation of green innovation in these relationships. The study applies quantitative research, collecting data through a cross-sectional survey of 432 employees in 58 large construction firms. Structural equation using modeling (SEM. Results of the study show that financial incentives, such as subsidy and tax benefits, improve resource efficiency, while non-objective/financial incentives, such as certificates increase recognition, stakeholder satisfaction, and competition. Companies should consider the adoption of both types of incentives to catalyze green innovation and align their operations with sustainability goals. Practical implications emphasize the need for firms to integrate both incentives and foster a culture of green innovation to achieve long-term sustainability goals. Policymakers are encouraged to design supportive frameworks that promote ecological incentives and innovation, particularly in developing economies facing resource constraints.

KEYWORDS
Green financial incentives, Green nonfinancial incentives, Green innovation, Green project performance, Construction industry, Quantitative analysis.

1 | INTRODUCTION

The environmental sustainability literature underscores the pressing global challenges that require urgent solutions. As a result, the impact of professional operations on the natural environment has increased the increasing social and academic attention (Aragón-Correa et al., 2008; Delmas & Pekovic, 2018), because highly industrial activities contribute to environmental decline and imbalance (Bansal & Song, 2017). For example, increasing concerns like global warming, resource loss and pollution have operated calls to reduce their environmental footprint for businesses and adopt sustainable practices. However, researchers take precautions that without transformational changes in current approaches, it is difficult to achieve important environmental reforms (Newton & Harte, 1997).

A complicated strand of stability research highlights how businesses faster ecological financial and non-objective incentives as a means of promoting environmental responsibilities and improving the results of the project performance. Such incentives can motivate firms to pursue new strategies that integrate environmental concerns into their operations, leading to better environmental, financial, and stake results. Evidence suggests that the firms adopting these incentives often experience better results, such as better operating efficiency and stake satisfaction, compared to those who ignore such practices (Danso et al., 2019). However, the underlying question remains: under which circumstances do these incentives translate into better performance results? This is important because while encouragement can promote environmental responsibility, their success often depends on additional factors, such as how they are applied and supported within the organization. To address this question, this paper focuses on the role of ecological innovation as an arbitration mechanism in relationships between ecological incentives and green project performance. Ecological innovation,

 © 2025 Unwan Sciences Society

environmentally characterized by durable technologies, processes, or development of products, is widely recognized as an important driver of better environment and financial results (Rennings & Zwick, 2002; Stefan & Paul, 2008). The study makes the natural resource-based visual (NRBV) (Chan, 2005; Hart, 1995), which argues that firms are involved in their strategic decision-making processes involving environmental ideas. Time-operating is better to address uncertainties. Competitive advantage. This study posits that organizations leveraging ecological resources through sustainable technologies, processes, and innovations can create long-term competitive advantages while mitigating environmental risks. The NRBV asserts that firms that embed environmental considerations into their strategic decision-making and operational processes are better equipped to manage external uncertainties, enhance resource efficiency, and achieve sustained performance improvements (Banerjee, 2001; Hart, 1995).

Previous research of (Edem, 2023; Rana et al., 2021) has predominantly emphasized financial incentives, such as subsidies and tax benefits, underestimating the importance of non-financial incentives, such as regulatory support, public recognition, and training programs. This imbalance limits the understanding of how various incentives collectively influence the results of the green project. Whereas some other studies like (MacNaughton et al., 2018; Samosir et al., 2020; Yuan et al., 2020) frequently rely on narrow performance indicators, such as cost savings or energy efficiency, while ignoring broader measures like environmental impact, social benefits, and long-term sustainability. This narrow focus undermines the comprehensive evaluation of green project success. This paper bridges the gap by examining these dynamics via data from 58 manufacturing firms in China, a developing economy with increasing environmental challenges and opportunities for sustainability-focused growth. The study makes several significant contributions. First, it extends the sustainability literature by analyzing the effects of financial and nonfinancial ecological incentives on environmental, financial, and stakeholder satisfaction outcomes in green projects. Second, it introduces ecological innovation as a mediating factor, providing a nuanced understanding of how firms can leverage innovation to translate incentives into meaningful results. Third, the paper contributes to the limited research on manufacturing firms in developing economies, offering context-specific insights into the intersection of ecological incentives, innovation, and performance. This is particularly important as developing economies like China grapple with heightened environmental concerns and the push for sustainable development. Moreover, the rapid integration of many developing countries into global production networks highlights the importance of sustainable practices. In these economies, poor environmental standards pose significant risks, and understanding how ecological incentives and innovation can help to align stability with better performance. This study can inform policy structures and managerial strategies to promote sustainable development in resource-references.

The paper has been structured as follows: First, the theoretical outline and hypothesis are outlined. Next, the research design is presented, including sample selection and data collection methods. Analysis and results are discussed, followed by a conclusion that shows theoretical contribution to future research, practical implications, and path. Through this study, we want to deepen our understanding of how ecological incentives and innovation shape stability-driven performance results, especially in the context of developing economies.

Hypothesis Development

Green financial incentives, including subsidies, tax incentives, green securities, low-interest rate loans, and other financial mechanisms, are designed to promote environmentally friendly projects such as renewable energy facilities, sustainable agriculture, construction of green buildings, and pollution reduction initiatives (Taghizadeh-Hesary & Yoshino, 2020). A growing body of literature shows that green financial incentives are positively related to GPP, which refers to the success and impact of environmentally durable initiatives in the context of financial results and environmental benefits (Stefan & Paul, 2008). Green financial incentives reduce these financial barriers, making it more attractive for companies and individuals to invest in sustainability. As a result, projects are more likely to be started and completed (He et al., 2019). Many green projects involve technological uncertainties, market risks and regulatory challenges. GFI can reduce these risks, and provide financial assistance in the form of favorable subsidies, insurance, or loans, leading to greater project stability and performance (Koval et al., 2022). GFIS encourages companies to invest in new technologies and permanent practices. For example, tax innovation for green innovation stimulates research and development in clean technologies (R&D), which leads to better prolonged project results (Song et al., 2020). Such as companies apply new technologies, they achieve better energy efficiency, reduce carbon footprints, and have more performance matrix in terms of environment and financial consequences. GFIS supply usually improves economic viability of green projects. Green incentives make projects more economically viable, improve cash flow, reduce financing costs and increase profitability, which increases performance. Studies show that projects supported by green financial mechanisms show high performance in terms of stability results (Tournebize et al., 2022).

H1: Green financial incentives are positively related to green project performance.

Various motivational factors are designed to encourage stakeholders (employees, project managers, contractors, and other participants) to include and support them in a green non-economic incentive (Adegbile et al., 2017). Are included. These may include recognition and reputation, environmental certificate and label, opportunities for advancement, and social and moral responsibility (Derchi et al., 2023). A study by Li et al. (2011) It was revealed that public recognition and environmental certificates contributed significantly to the success of green construction projects. The study describes how the encouragement of these non-sequences increased the stability of the project team members and the stability of better environmental results, such as low carbon emissions and more efficient resource uses. The role of green organizational practices and non -gaur -verses (such as career development opportunities and environmental certificates) to motivate employees to improve stability results in green manufacturing projects (Jabbar et al., 2020). They found that when the employees considered their contribution to stability as valuable, their performance in the Green initiative greatly improved. The effect of financial incentives on the influence of inexperienced delivery chain control initiative (Hervani et al., 2005). The appearance indicates that non-monetary rewards such as the popularity of high management and the adoption of inexperienced chain certificates help decorate the commitment of providers and colleagues, leading to high overall performance in key environmental matrix. Fosu et al. (2024) examined how CSR tasks, supported by using nonfinancial incentives, decorate the performance of green innovation initiatives. The researchers reported that personnel given possibilities for popularity and development within CSR-centered businesses had been much more likely to make contributions to inexperienced innovations, resulting in higher challenge success costs. So, it is hypothesized that

H2: Green nonfinancial incentives are positively related to green project performance.

Green innovation refers to the development and application of new products, processes or practices that contribute to environmental sustainability (Takalo & Tooranloo, 2021). It may involve enhancements in energy efficiency, emission reductions, and the use of renewable resources. As the world faces growing environmental challenges, organizations and governments have recognized the importance of promoting green innovation (Tariq et al., 2017). One of the main mechanisms used to encourage these innovations is through green financial incentives, designed to reduce the risks and financial costs associated with the development and adoption of green technology (Lv et al., 2021). The availability of financial incentives was one of the main drivers of innovation, as companies were more willing to invest in research and development with reduced financial risk (Popp, 2020). The relationship between financial incentives provided by the government and green innovation in the manufacturing sector. Financial/Economic incentives, together with tax incentives for energy production processes, have an effective effect at the adoption of inexperienced technologies. Companies on this examination have been more likely to put money into purifier technology, which includes machines with strong performance when delivered with economic help (Chen & Chang, 2013). Studies also highlighted the role of green financial incentives in emerging economies. For example, in China, where green innovation has been a priority due to its significant environmental challenges, financial incentives, such as electric vehicle subsidies and renewable energy projects, led to an increase in innovation in these sectors (Zhang & Bai, 2017). These incentives not only promoted green innovation but also helped build a market for sustainable products. Then the study raised the hypothesis that:

H3: Green financial incentives are positively associated with green innovation.

Research shows that non-financial incentives along with environmental awards or positive media insurance can have a significant impact on the organization's decision to spend money on green innovation. Achieving sustainable methods ends the growth of investments in inexperienced technologies, as it improves the employer's public image and attracts the attention of consumers and buyers who importance of stability (Zhu et al., 2013) . Non-economic incentives can also accommodate pressure imposed by regulators and market routes. For example, governments can reward groups with preferential popularity or treatment for their environmental efforts, growing a wonderful response cycle that promotes maximum innovation. Environmental regulation can stimulate innovation, and non-economic reputation can further increase this effect, indicating the organization's commitment to stability. Access to networks and collaborations is another non-financial incentive that has been associated with green innovation. Companies involving collaborative environmental initiatives, such as joint ventures or sustainability partnerships, tend to experience higher innovation results (Porter & Linde, 1995), these networks facilitate the exchange of knowledge, resource sharing, and the diffusion of innovation, which finally leads to the most advanced Green Technologies (Melander & Pazirandeh, 2019). Eco-innovation reveals that companies that receive environmental prizes are more likely to participate in the development of new products that are focused on durability. This suggests that faith and reputation associated with prizes act as powerful non-financial incentives for innovation (Pujari, 2006) The above

discussion reveals that
H4: Green nonfinancial incentives are positively related to green innovation.

A growing research body suggests that green innovation has a direct and positive effect on the performance of green projects. Companies that invest in green innovation are more likely to achieve better environmental performance in their projects, especially in terms of reducing emissions and waste (Dangelico & Pujari, 2010). In the construction industry, the implementation of green construction techniques (eg, energy efficiency HVAC systems and solar panels) has been shown to reduce operating costs and increase project profitability (Azizi et al., 2021). The use of advanced green technologies in construction projects improved project efficiency, reducing material waste and optimizing energy consumption, which contributed to better project results (Liu et al., 2020). A study by Altaf, Li et al. (2025) has shown that companies involved in green innovation are more likely to achieve a high level of stake satisfaction, which contributes to the overall success of the project. Green innovation plays an important role in improving the environment, economic and social results of green projects (Chygryn et al., 2020). By reducing environmental impacts, increasing project efficiency, reducing costs, and improving stake partnership, green innovations contribute to the success of green projects. However, challenges such as high early costs, lack of knowledge, and regulatory barriers should be addressed to fully perform the capacity of green innovation in the operation of sustainable project performance (Zhang et al., 2023). So, the study concluded that:
H5: Green innovation is positively related to green project performance.

Mediation Effect of Green Innovation

The connection between green financial incentives and the performance of the green project is complex and multifaceted. Although financial incentives provide the necessary resources, their effectiveness is significantly influenced by a company's ability to innovate in a way that leads to better environmental results (Porter & Linde, 1995). By developing new products, services or processes that meet environmental objectives, green innovation can contribute directly to improving green project performance. For example, companies that adopt ecological principles in product development or integrate energy-saving technologies into their manufacturing processes are more likely to meet sustainability goals (Chen & Chang, 2013). As such, green innovation fills the gap between financial incentives and the real environmental results of a project. Studies indicate that financial incentives alone are insufficient to ensure the success of the green project unless it is combined with strong innovation capacity. Financial incentives for the adoption of green technology are usually more effective when companies can also integrate these technologies into their operations (Chygryn et al., 2020). This suggests that green innovation mediates the effect of financial incentives on project performance, ensuring that incentives are efficiently used to develop and implement sustainable solutions.

From the NRBV point of view, the successful performance of green projects depends not only on financial resources but also on the ability of a company to integrate environmental capabilities in its operations (Hart & Dowell, 2011). Green innovation is a capacity-cavity in this process. Financial incentives, by providing the necessary capital, allow companies to invest in R&D that promotes the development of these capabilities, improving the results of the green project. NRBV also emphasizes the importance of using external resources, such as government incentives, to complement internal capabilities to boost sustainable performance (Aragón-Correa et al., 2008). So, the hypothesis above was that:

H6: Green innovation has a mediating effect on the relationship between green financial incentives and green project performance.

It has been shown that non-financial incentives, such as environmental certifications, government support, and organizational recognition, positively influence to what extent companies adopt green innovations (Dangelico & Pujari, 2010). It was found that green innovation significantly enhances the performance of the green project, allowing companies to reduce their environmental impact, meet regulatory requirements, and differ in the market (Lee et al., 2016). Some studies suggest that green innovation totally or partially measured the relationship between green incentives and the performance of the green project, demonstrating that while incentives can motivate companies to innovate, real performance gains come from the successful implementation of green innovations. (Zhang et al., 2016). It has been shown that non-financial incentives such as environmental certifications, government support, and organizational recognition, positively influence to what extent companies adopt green innovations (Dangelico & Pujari, 2010). It was found that green innovation significantly enhances the performance of the green project, allowing companies to reduce their environmental impact, meet regulatory requirements, and differ in the market (Lee et al., 2016). Some studies suggest that green innovation totally or partially measured the relationship between green incentives and the performance of the green project, demonstrating that while incentives can motivate companies to innovate, real performance gains come from the successful implementation of green innovations (Zhang et al., 2016).

From the NRBV point of view, the relationship between non-financial incentives and the performance

of the green project is better understood through the lens of resource-based theory, where innovation acts as a dynamic capacity that allows companies to explore environmental opportunities (Porter & Linde, 1995). Non-financial incentives (such as reputation certificates or promotions) motivate companies to take advantage of their natural resources and abilities to develop green innovations. This innovation, in turn, improves the performance of green projects, solves environmental challenges, and offers high environmental results (Makhloufi et al., 2022). That concludes that:

H7: Green innovation has a mediating effect on the relationship between green nonfinancial incentives and green project performance.

Methods

Cross-Sectional Research Design

The study used a cross-sectional design, which collects data from participants relating to the manufacturing sector. This approach featured immediate evaluation of employee approach in selected firms, offering a broad snapshot of the dynamics of the workforce in the construction industry of Jiangsu. The option aligns with the need for efficiency in catching contemporary phenomena, especially in areas with rapid industrial and economic growth (Li, Yang et al. 2020). By focusing on the present, the design supports the identification of prevalent trends, approaches or conditions without resource demands of longitudinal tracking.

The logic for this method lies in its suitability for clinical purposes. Given Jiangsu's prominence as a construction center, stakeholders may require timely insight to inform policy or operational decisions. However, this design inhibits the analysis of temporary changes, a limit that can restrict insight into developing workforce issues. However, the cross-individual approach is both practical and theoretically sound (Butt, Altaf et al. 2019).

Simple Random Sampling Technique

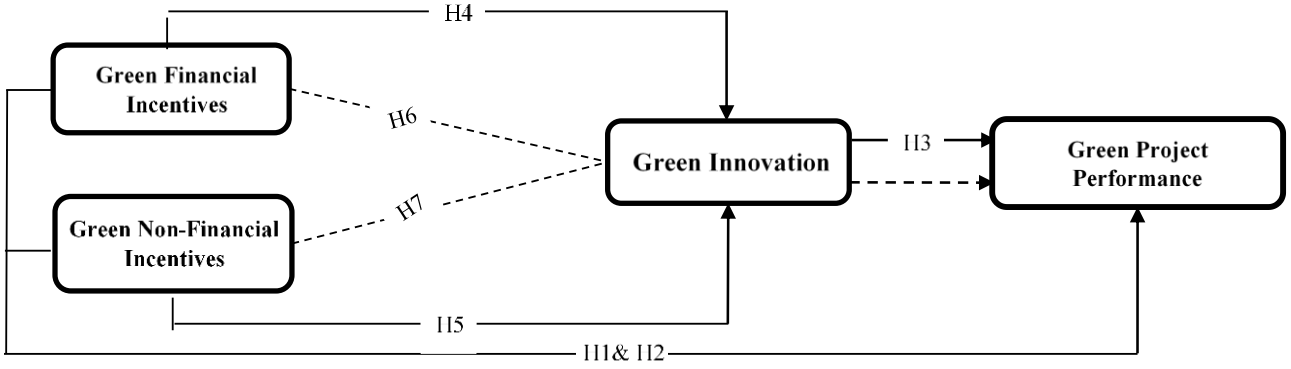
To select samples of 540 employees, researchers employ a simple random sampling technique supported by Altaf et al. (2016). This method ensures that each employee within the population has the same possibility of involving each employee, reducing prejudice, and increasing the representation of the sample. In terms of Jiangsu's construction industry, where the firm may vary in scale, expertise, or geographical distribution, randomization reduces the risk of over specific subgroups, supporting the generality of conclusions.

The logic for this technique is based on statistical validity. Random sampling underlines the perceptions of many quantitative analyses, which enable strong inferior conclusions (Levitt, Bamberg et al. 2018). Its effectiveness, however, depends on access to a full sample frame. While the study does not address potential intervals - such as excluding informal or temporary workers - adopting this method reflects a commitment to the functioning of the functioning and aligns with the target of capturing a diverse employee perspective.

Data Exclusion and Quality Control

Of the 540 distributed questionnaires, 432 were maintained for analysis, with incomplete or unfairly full reactions, after Levitt, Bamberg et al. (2018). This stringent filtering process underlines the priority laid on data integrity, as incomplete datasets can compromise the validity of statistical analysis, such as regression or structural equation modeling, usually employed in the workforce study.

The logic for this decision centers on analytical reliability. Except for flawed reactions, the researchers ensured that later conclusions relaxed on a reliable foundation, increasing the reliability of their conclusions. As a result, 80% of the response rate indicates strong participant engagement, although excluding 108 reactions raises questions about non-reaction bias. While the study does not detect the characteristics of non-extenders, the emphasis on quality on quantity reflects standard practice in quantitative research, giving priority to data-operated insight.



Variables	Methods of measurement	Source

Green Financial Incentives (GFI)	1. Current financial incentives are efficient and effective in order to make green construction affordable. 2. Current financial incentives are easily accessible for potential green construction. 3. Current loan system can cover higher cost of green constructions for their purchasers affordably. 4. There are variations of financial incentives for green construction manufacturers/buyers/investors, to choose them based on their financial conditions. 5. Current financial schemes are enough attractive to push people toward green construction instead of normal. 6. Current green construction financial incentives are satisfactory. 7. longer payback period compared to normal homes' mortgages. 8. There are lower-interest loans on green construction 9. There is a Lower down payment on green construction. 10. Using potential savings on utility bills as monthly income to provide higher credit to apply for higher amount mortgages. 11. Tax income exemption. 12. Government rebate on green home purchase (fixed amount). 13. Government subsidy on a green home purchase (a certain percentage of price).	(Ghodrati et al., 2012; Olubunmi et al., 2016)
Green Non-Financial Incentives (GNFI)	1. Support Services by the government is appropriate 2. Technical Assistance helps to use green resources efficiently 3. Education and Training improve project performance 4. Information Sharing by government is useful	
Green Innovation (GI)	1. The company chooses the materials of the product that produce the least amount of pollution for conducting the product development or design. 2. The company chooses the materials of their products that consume the least amount of energy and resources for conducting the product development or design. 3. The company uses the fewest number of materials to comprise their products for conducting the product development or design. 4. The company would circumspectly evaluate whether their products are easy to recycle, reuse, and decompose for conducting the product development or design. 5. The manufacturing process of the company effectively reduces the emission of hazardous substances or wastes. 6. The manufacturing process of the company effectively recycles wastes and emission that can be treated and re-used. 7. The manufacturing process of the company effectively reduces the consumption of water, electricity, coal, or oil. 8. The manufacturing process of the company effectively reduces the use of raw materials	(Chen et al., 2016).
Green Project Performance (GPP)	*(i)Financial Performance (FP)* 1. Green construction increases sales growth of Project 2. Green construction increases the profit growth of Project 3. Green construction increases return on assets of the Project 4. Green construction increases the Return on investment of the Project 5. Green construction increases market share growth of Project 6. Green construction improves the overall efficiency of operations of the Project *(ii)Environmental Performance (EP)* 1. In green construction return on sales is high 2. Green construction reduces pollution 3. Green construction reduces energy and materials consumption 4. Green construction reduces the consumption of hazardous/harmful/toxic materials 5. Green construction reduced the frequency for environmental accidents *(iii)Stakeholders Satisfaction (SS)* 1. I am satisfied with the benefits I receive from my relationships with those I work with. 2. My feelings toward those I work with are positive. 3. I feel enthusiastic about my relationships with the people I work with. 4. All in all, I am satisfied with my relationships with the people I work with. 5. I am satisfied with the benefits I receive from my stakeholder relationships. 6. I am committed to my stakeholders. 7. My feelings toward my stakeholders are positive. 8. I feel enthusiastic about my stakeholder relationships. 9. All in all, I am satisfied with my stakeholder relationships	(Jiang et al., 2018) (Mazur & Pisarski, 2015)

Methodological Coherence and Implications

Collectively, these cross-sectional designs, simple random sampling, online surveys, and a harmonious method structure to suit the context of a rigorous data incursion study. The cross-sectional approach captures the industry profile at a time, while the random sample supports the representative insight. The online survey method facilitates efficient, standardized data collection,

and protects the boycott of incomplete responses from analytical strength. These options align to generate actionable, generally to generate conclusions for the construction area of Jiangsu, possibly in descriptive and inferiority statistical analysis (e.g., comparison or correlation tests) to address research questions related to the workforce.

Measures

The study designed a questionnaire with the help of guidelines mentioned in previous studies published by several researchers. In this study, we investigated two independent variables (green performance and mastery climates), one as a mediator variable (green innovation) and one as a dependent variable (green project performance). The responses were collected via a Likert scale ranging from 1 to 5 (strongly disagree to strongly agree).

Reliability and Validity Tests

Results and Data Analysis

The structural equation modeling (SEM) method was used to test the hypotheses. This method was used to check the causal effect between indicators. Currently, this technique is widely used in management science research to measure relationships (Altaf et al., 2016).

Table 1: EFA factor loading

Constructs	Measurement	Factor Loading	Cronbach's Alpha	CR	AVE	VIF
Green Financial Incentives (GFI)	GFI 1	0.872	0.831	0.954	0.601	2.09
	GFI 2	0.821				
	GFI 3	0.863				
	GFI 4	0.775				
	GFI 5	0.863				
	GFI 6	0.853				
	GFI 7	0.831				
	GFI 8	0.778				
	GFI 9	0.801				
	GFI 10	0.893				
	GFI 11	0.874				
	GFI 12	0.832				
	GFI 13	0.799				
Green Non-Financial Incentives (GNFI)	GNFI 1	0.863	0.817	0.893	0.541	1.97
	GNFI 2	0.736				
	GNFI 3	0.722				
	GNFI 4	0.912				
Green Innovation (GI)	GI 1	0.863	0.862	0.890	0.522	1.99
	GI 2	0.900				
	GI 3	0.872				
	GI 4	0.786				
	GI 5	0.775				
	GI 6	0.851				
	GI 7	0.901				
	GI 9	0.799				
Green Project Performance (GPP*)*			0.799	0.843	0.554	1.78
(i)Environmental Performance	EP 1	0.899				
	EP 2	0.821				
	EP 3	0.842				
	EP 4	0.854				
(ii)Financial Performance	FP 1	0.783				
	FP 2	0.732				
	FP 3	0.731				
	FP 3	0.821				
	FP 4	0.843				
	FP 6	0.789				
	FP 7	0.800				
(iii)Stakeholders Satisfaction	SS 1	0.900				
	SS 2	0.863				
	SS 3	0.721				
	SS 4	0.898				
	SS 5	0.889				
	SS 6	0.799				
	SS 7	0.805				
	SS 8	0.863				
	SS 9	0.901				

Table 2: Discriminant validity

	GFI	GNFI	GI	GPP
GFI	0.823			
GNFI	0.776	0.755		
GI	0.340	0.217	0.877	
GPP	0.787	0.722	0.299	0.863

Table 3: Direct effects

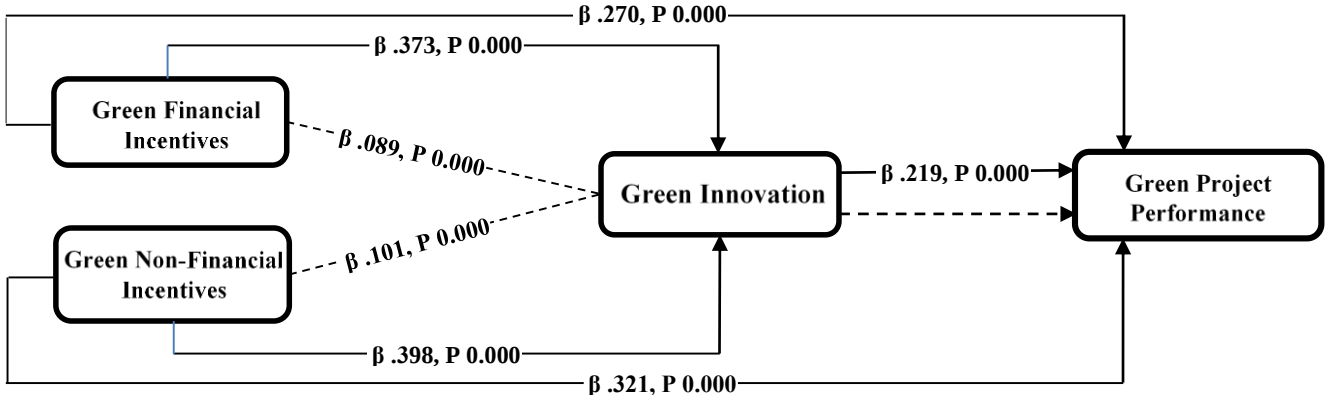
Hypotheses	Relationship	β	T	p	Supported/Not Supported
H1	GFI and GPP	0.321	3.832	0.000	Supported
H2	GNFI and GPP	0.270	2.365	0.000	Supported
H3	GI and GPP	0.219	2.221	0.000	Supported
H4	GFI and GI	0.373	2.736	0.000	Supported
H5	GNFI and GI	0.398	2.824	0.000	Supported

Table 4: Indirect effects

Hypotheses	Relationship	β	T	p	Supported/Not Supported
H6	GFI, GI, and GPP	0.089	2.475	0.000	Supported
H7	GNFI, GI, and GPP	0.101	2.592	0.000	Supported

Table 5: Mediation through Bootstrapping

IVs	Standardized Indirect Effect	Lower	Upper	Standardized Direct Effect	Total Effect	Results
GMC-GI- GPP	0.089	0.041	0.725	0.372	0.461	Partial mediation
GPC-GI-GPP	0.101	0.051	0.425	0.172	0.273	Partial mediation



Test of Hypotheses
Direct effects

3 RESULTS AND DISCUSSION

The results of hypothesis H1 reveal a significant positive relationship between Green Financial Innovation and Green Project Performance (β = 0.321, T = 3.832, p = 0.000). This finding indicates that the GFI plays a crucial role in enhancing project outcomes by focusing on specific financial improvements aligned with sustainability objectives (He et al., 2019; Stefan & Paul, 2008). GFI ensures efficient use of resources and a combination of ecological techniques, increasing project overall performance**.** Hypothesis H2 demonstrates that non-economic inexperienced innovation substantially affects green undertaking overall performance (β = zero.270, t = 2.365, p = 0.000). GNFI emphasizes improvements in regions consisting of user, aesthetic and logo enjoyment, which affect green venture effects, increasing stakeholder satisfaction and marketplace competitiveness (Adegbile et al., 2017; Jabbar et al., 2020; Li et al., 2011). The consequences of hypothesis H3 show a significant effect of inexperienced innovation on green task performance (β = 0.219, t = 2.221, p = 0.000). It emphasizes the significance of the use of broad inexperienced practices that address the financial and non-financial elements inside the initiative (Takalo & Tooranloo, 2021; Tariq et al., 2017). GI facilitates to fulfillment the dreams of stability and keeping an aggressive advantage in ECO-Cronusian Markets (Chen & Chang, 2013; Zhang & Bai, 2017). H4 outcomes imply that green economic innovation undoubtedly and significantly influences inexperienced innovation (β = 0.373, t = 2.736, p = 0.000). This indicates that financial enhancements serve as fundamental components of broader inexperienced innovation efforts, promoting sustainable improvement and technological development (Melander & Pazirandeh, 2019; Phonthanukitithaworn et al., 2023;

Zhu et al., 2013). Hypothesis H5 demonstrates a strong positive relationship between non-financial innovation and green innovation (β = 0.398, t = 2.824, p = 0.000). This discovery shows that non-financial improvements, such as aesthetics and improved brand, contribute significantly to promoting comprehensive green innovation, thus increasing the overall sustainability of projects (Azizi et al., 2021; Chygryn et al., 2020; Liu et al., 2020). The results reveal that green innovation partially mediates the relationship between green financial innovation and green project performance (β = 0.089, t = 2.475, p = 0.000). This discovery indicates that although GFI directly improves project performance, its impact is amplified by its contribution to broader green innovation efforts (Aragón-Correa et al., 2008; Chen & Chang, 2013; Hart & Dowell, 2011). Similarly, green innovation partially meddles with the relationship between non-financial innovation green and green project performance (β = 0.101, t = 2.592, p = 0.000). This highlights the role of GNFI in increasing project results and promoting innovative practices that integrate financial and aesthetic improvements (Dangelico & Pujari, 2010; Lee et al., 2016; Makhloufi et al., 2022; Zhang et al., 2016). Bootstrapping analysis also confirms the mediating role of green innovation in the following relationships: green innovation partially measures this relationship, with a standardized indirect effect of 0.089 (lower = 0.041, upper = 0.725), a direct effect of 0.372, and a total effect of 0.461. This emphasizes the importance of financial innovation to boost project performance through its role in promoting innovation. Green innovation partially meddles this relationship, with a standardized indirect effect of 0.101 (lower = 0.051, upper = 0.425), a direct effect of 0.172, and a total effect of 0.273. This discovery demonstrates that non-financial innovation enhances project results, contributing to broader green innovative initiatives.

Practical Implications

The results of this study highlight the critical role of green and non-financial ecological incentives in the drive for environmental sustainability in companies. For companies, particularly manufacturing companies in developing economies, such as China, designing and implementing effective ecological incentives can significantly increase the performance of the green project. Green financial incentives can promote the efficiency of resources, while financial incentives are not green, such as better experience and brand of the user, promotion of market competitiveness, and stakeholder satisfaction. Therefore, companies should consider adoption of both types of incentives to catalyze green innovation and align their operations with sustainability goals. The consequences of this look to release the essential position of green and non-economic ecological incentives within the force of environmental stability in groups. For corporations, specifically in developing economies like China, manufacturing organizations, creating and implementing powerful ecological incentives can notably increase the functioning of the green venture. Encouraging a culture of innovation that integrates sustainability into all aspects of business operations will enable companies to achieve superior green financial and environmental outcomes, particularly in resource-constrained environments. The study's findings suggest that policy frameworks should support manufacturing firms by creating environments conducive to adopting ecological incentives and innovations. Policymakers could offer subsidies or tax benefits to businesses that integrate green innovation practices and encourage knowledge sharing and training to help firms, especially in developing economies, implement sustainable business practices. This not only enhances corporate performance but also contributes to national sustainable development goals. Businesses should prioritize stakeholder satisfaction by integrating ecological considerations into their operations. Nonfinancial innovations, such as improved aesthetics or eco-friendly branding, can serve to strengthen relationships with stakeholders, build brand loyalty, and differentiate companies in competitive markets. Engaging stakeholders through transparent and sustainable practices will boost a company's reputation and overall performance.

Theoretical Implications

This study contributes to the NRBV by demonstrating how ecological innovation mediates the relationship between ecological incentives and green project performance. While the NRBV has traditionally focused on how environmental considerations can create competitive advantages, this research expands it by introducing ecological innovation as a crucial link between incentives and performance outcomes. The findings suggest that ecological innovation, whether in the form of green financial or non-financial changes, is central to realizing the benefits of sustainability-driven strategies. The theoretical model introduced in this study emphasizes the mediating role of ecological innovation in the relationship between ecological incentives and green project performance. This improves the literature and suggests that only offering organic incentives may not be sufficient to achieve the desired results. Instead, integration of innovation is necessary to translate these incentives into real and medium-sized reforms, especially organic innovation. This provides a more subtle understanding of how companies can benefit from established stability strategies for competitive benefits. By focusing on the green and non-correspondent economic incentives, this research enriches the literature on green innovation and offers a wider structure that captures different dimensions of stability-related innovation. This suggests that green innovation should not be viewed as a one-

dimensional concept but rather as a multifaceted approach that includes both technical and aesthetic improvements. This can expand future research on the relationships among innovation, sustainability, and firm performance. The study provides theoretical contributions that are specifically relevant to developing economies. While much of the sustainability and innovation literature has focused on developed economies, this study highlights the unique challenges and opportunities faced by manufacturing firms in developing countries such as China. It underscores the importance of ecological incentives and innovations in contexts where resources may be limited but the drive for sustainability is intensifying. The findings open the door for further research into how firms in developing economies can use sustainable practices to navigate environmental challenges and improve their competitive position in the global marketplace.

Limitations and Future Directions

Despite its precious contributions, this examination has several obstacles that offer possibilities for future studies. First, the pattern is confined to 266 manufacturing groups in China, which might not completely constitute the broader range of businesses in other growing economies.

Future studies can extend this research to include a more diverse set of companies in different regions to increase the generalization of results. Second, this study is based on transverse data, which captures only instantaneous relationships between ecological incentives, innovation, and performance.

Longitudinal research will be beneficial to check how these dynamics develop and better understand the long-term effects of ecological incentives and innovations on the company's performance. In addition, while construction companies were focused on, future studies can detect the impact of ecological incentives and innovation in large companies or multinational corporations, which affects the size of the company on how the performance of stability affects the size of the company. Provides comparative perspective.

Another potential Avenue for future research is the exploitation of industry-specific factors that can affect ecological incentives and the effectiveness of innovations. Service - Compared to the based areas, industries with more intensive environmental footprints such as manufacturing or agriculture can withstand various challenges and opportunities.

Finally, investigating the role of external factors such as government policies and international regulations in the formation of the adoption of incentives and ecological innovations can offer valuable information on how companies can navigate in broader institutional environments to achieve sustainability goals.

REFERENCES

Adegbile, A., Sarpong, D., & Meissner, D. (2017). Strategic foresight for innovation management: A review and research agenda. International Journal of Innovation and Technology Management, 14(04), 1750019.

Altaf, S., Faraz, R. M., & Ahmed, S. (2016). Impact of green brand awareness and brand credibility on consumer green purchasing decision with mediating role of brand image and moderating role of Social Media Marketing.

Altaf, S., et al. (2025). "Leading for a Greener Future: How Green Vertical Leadership Shapes Innovation and Project Success." International Journal of Current Science Research and Review 08(04): 1650-1659.

Aragón-Correa, J. A., Hurtado-Torres, N., Sharma, S., & García-Morales, V. J. (2008). Environmental strategy and performance in small firms: A resource-based perspective. Journal of Environmental Management, 86(1), 88-103.

Azizi, M. R., Atlasi, R., Ziapour, A., Abbas, J., & Naemi, R. (2021). Innovative human resource management strategies during the COVID-19 pandemic: A systematic narrative review approach. Heliyon, 7(6).

Banerjee, S. B. (2001). Managerial perceptions of corporate environmentalism: Interpretations from industry and strategic implications for organizations. Journal of Management Studies, 38(4), 489-513.

Bansal, P., & Song, H.-C. (2017). Similar but not the same: Differentiating corporate sustainability from corporate responsibility. Academy of Management Annals, 11(1), 105-149.

Butt, R. S., et al. (2019). "Analyzing the role of quality of work life and happiness at work on employees job satisfaction with the moderation of job stress, empirical research of jiangsu university." International Journal of Scientific and Technology Research 8(10): 1905-1915

Chan, R. Y. (2005). Does the natural-resource-based view of the firm apply in an emerging economy? A survey of foreign invested enterprises in China. Journal of Management Studies, 42(3), 625-672.

Chen, Y.-S., & Chang, C.-H. (2013). The determinants of green product development performance: Green dynamic capabilities, green transformational leadership, and green creativity. Journal of Business Ethics, 116, 107-119.

Chen, Y. S., Chang, T. W., Lin, C. Y., Lai, P. Y., & Wang, K. H. (2016). The influence of proactive green innovation and reactive green innovation on green product development performance: The mediation role of green creativity. Sustainability, 8(10), 966.

Chygryn, O. Y., Bilan, Y. V., & Kwilinski, A. (2020). Stakeholders of green competitiveness: Innovative approaches for creating communicative system.

Dangelico, R. M., & Pujari, D. (2010). Mainstreaming green product innovation: Why and how companies integrate environmental sustainability. Journal of Business Ethics, 95, 471-486.

Danso, A., Adomako, S., Amankwah-Amoah, J., Owusu-Agyei, S., & Konadu, R. (2019). Environmental sustainability orientation, competitive strategy and financial performance. Business strategy and the Environment, 28(5), 885-895.

Delmas, M. A., & Pekovic, S. (2018). Corporate sustainable innovation and employee behavior. Journal of Business

Ethics, 150, 1071-1088.
Derchi, G.-B., Davila, A., & Oyon, D. (2023). Green incentives for environmental goals. Management Accounting Research, 59, 100830.
Edem, A. (2023). Examining the effect of corporate taxation planning on the financial performance of listed financial and non-financial institutions in ghana KNUST].
Fosu, E., Fosu, F., Akyina, N., & Asiedu, D. (2024). Do environmental CSR practices promote corporate social performance? The mediating role of green innovation and corporate image. Cleaner and Responsible Consumption, 12, 100155.
Ghodrati, N., Samari, M., & Shafiei, M. W. M. (2012). Investigation on government financial incentives to simulate green homes purchase. World Applied Sciences Journal, 20(6), 832-841.
Hart, O. (1995). Corporate Governance: Some Theory and Implications. The Economic Journal, 105(430), 678-689. https://doi.org/10.2307/2235027
Hart, S. L. (1995). A Natural-Resource-Based View of the Firm. The Academy of Management Review, 20(4), 986-1014. https://doi.org/10.2307/258963
Hart, S. L., & Dowell, G. (2011). Invited editorial: A natural-resource-based view of the firm: Fifteen years after. Journal of Management, 37(5), 1464-1479.
He, Q., Wang, T., Chan, A. P., Li, H., & Chen, Y. (2019). Identifying the gaps in project success research: A mixed bibliographic and bibliometric analysis. Engineering, Construction and Architectural Management, 26(8), 1553-1573.
Hervani, A. A., Helms, M. M., & Sarkis, J. (2005). Performance measurement for green supply chain management. Benchmarking: An International Journal, 12(4), 330-353.
Jabbar, M. N., Mahmood, W., & Qambar, G. (2020). Mediating role of organizational commitment and work environment on the relationship between transformational leadership and job satisfaction. Journal of Talent Development and Excellence, 12(2), 3974-3988.
Jiang, W., Chai, H., Shao, J., & Feng, T. (2018). Green entrepreneurial orientation for enhancing firm performance: A dynamic capability perspective. Journal of Cleaner Production, 198, 1311-1323.
Koval, V., Laktionova, O., Atstāja, D., Grasis, J., Lomachynska, I., & Shchur, R. (2022). Green financial instruments of cleaner production technologies. Sustainability, 14(17), 10536.
Lee, K. H., Cin, B. C., & Lee, E. Y. (2016). Environmental responsibility and firm performance: The application of an environmental, social and governance model. Business strategy and the Environment, 25(1), 40-53.
Levitt, H. M., et al. (2018). "Journal article reporting standards for qualitative primary, qualitative meta-analytic, and mixed methods research in psychology: The APA Publications and Communications Board task force report." American psychologist 73(1): 26
Li, C., et al. (2020). "Genetic evolution analysis of 2019 novel coronavirus and coronavirus from other species." Infection, Genetics and Evolution 82: 104285
Li, Y. Y., Chen, P.-H., Chew, D. A. S., Teo, C. C., & Ding, R. G. (2011). Critical project management factors of AEC firms for delivering green building projects in Singapore. Journal of Construction Engineering and Management, 137(12), 1153-1163.
Liu, J., Zhao, M., & Wang, Y. (2020). Impacts of government subsidies and environmental regulations on green process innovation: A nonlinear approach. Technology in Society, 63, 101417. https://doi.org/https://doi.org/10.1016/j.techsoc.2020.101417
Lv, C., Shao, C., & Lee, C.-C. (2021). Green technology innovation and financial development: do environmental regulation and innovation output matter? Energy Economics, 98, 105237.
MacNaughton, P., Cao, X., Buonocore, J., Cedeno-Laurent, J., Spengler, J., Bernstein, A., & Allen, J. (2018). Energy savings, emission reductions, and health co-benefits of the green building movement. J. Expo. Sci. Environ. Epidemiol, 28(4), 307-318.
Makhloufi, L., Laghouag, A. A., Meirun, T., & Belaid, F. (2022). Impact of green entrepreneurship orientation on environmental performance: The natural resource-based view and environmental policy perspective. Business strategy and the Environment, 31(1), 425-444.
Mazur, A. K., & Pisarski, A. (2015). Major project managers' internal and external stakeholder relationships: The development and validation of measurement scales. International Journal of Project Management, 33(8), 1680-1691.
Melander, L., & Pazirandeh, A. (2019). Collaboration beyond the supply network for green innovation: insight from 11 cases. Supply Chain Management: An International Journal, 24(4), 509-523.
Newton, T., & Harte, G. (1997). Green business: technicist kitsch? Journal of Management Studies, 34(1), 75-98.
Olubunmi, O. A., Xia, P. B., & Skitmore, M. (2016). Green building incentives: A review. Renewable and Sustainable Energy Reviews, 59, 1611-1621.
Phonthanukitithaworn, C., Srisathan, W. A., Ketkaew, C., & Naruetharadhol, P. (2023). Sustainable development towards openness SME innovation: taking advantage of intellectual capital, sustainable initiatives, and open innovation. Sustainability, 15(3), 2126.
Popp, D. (2020). Promoting clean energy innovation at the state and local level. Agricultural and Resource Economics Review, 49(2), 360-373.
Porter, M. E., & Linde, C. V. D. (1995). Toward a new conception of the environment-competitiveness relationship. Journal of Economic Perspectives, 9(4), 97-118.
Pujari, D. (2006). Eco-innovation and new product development: understanding the influences on market performance. Technovation, 26(1), 76-85.
Rana, A., Sadiq, R., Alam, M. S., Karunathilake, H., & Hewage, K. (2021). Evaluation of financial incentives for green buildings in Canadian landscape. Renewable and Sustainable Energy Reviews, 135, 110199.
Rennings, K., & Zwick, T. (2002). Employment impact of cleaner production on the firm level: Empirical evidence from a survey in five European countries. International Journal of Innovation Management, 6(03), 319-342.
Samosir, D. K. B. M., Murwaningsari, E., Augustine, Y., & Mayangsari, S. (2020). The benefit of green building for cost efficiency. International Journal of Financial, Accounting, and Management, 1(4), 209-219.
Song, M., Wang, S., & Zhang, H. (2020). Could environmental regulation and R&D tax incentives affect green product

innovation? Journal of Cleaner Production, 258, 120849.
Stefan, A., & Paul, L. (2008). Does it pay to be green? A systematic overview. Academy of management perspectives, 22(4), 45-62.
Taghizadeh-Hesary, F., & Yoshino, N. (2020). Sustainable solutions for green financing and investment in renewable energy projects. Energies, 13(4), 788.
Takalo, S. K., & Tooranloo, H. S. (2021). Green innovation: A systematic literature review. Journal of Cleaner Production, 279, 122474.
Tariq, A., Badir, Y. F., Tariq, W., & Bhutta, U. S. (2017). Drivers and consequences of green product and process innovation: A systematic review, conceptual framework, and future outlook. Technology in Society, 51, 8-23.
Tournebize, R., Borner, L., Manel, S., Meynard, C. N., Vigouroux, Y., Crouzillat, D., Fournier, C., Kassam, M., Descombes, P., & Tranchant-Dubreuil, C. (2022). Ecological and genomic vulnerability to climate change across native populations of Robusta coffee (Coffea canephora). Global Change Biology, 28(13), 4124-4142.
Yuan, Z., Zhou, J., Qiao, Y., Zhang, Y., Liu, D., & Zhu, H. (2020). BIM-VE-based optimization of green building envelope from the perspective of both energy saving and life cycle cost. Sustainability, 12(19), 7862.
Zhang, X., & Bai, X. (2017). Incentive policies from 2006 to 2016 and new energy vehicle adoption in 2010–2020 in China. Renewable and Sustainable Energy Reviews, 70, 24-43.
Zhang, Y., Chen, K., Zhu, G., Yam, R. C. M., & Guan, J. (2016). Inter-organizational scientific collaborations and policy effects: an ego-network evolutionary perspective of the Chinese Academy of Sciences. Scientometrics, 108(3), 1383-1415. https://doi.org/10.1007/s11192-016-2022-2
Zhang, Y., Phanniphong, K., & Li, P. (2023). Corporate greening initiatives and management governance: analysing their impact on project performance and stakeholder engagement. The Journal of Modern Project Management, 11(2), 132-153.
Zhu, Q., Geng, Y., & Sarkis, J. (2013). Motivating green public procurement in China: An individual level perspective. Journal of Environmental Management, 126, 85-95