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Unlocking Sustainable Entrepreneurship through Green Finance: The Mediating Role of Green Innovation in Pakistani SMEs

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<p>Dr. Nadia Samo Controller of Examinations, Aror University of Art, Architecture, Design, and Heritage, Sukkur Email: coe@aror.edu.pk</p> <p>Dr. Khalida Khan Lecturer, Salim Habib University Karachi</p> <p>Dr. Muhammad Naeem Faculty, Bahria University Karachi. rainaem63@yahoo.com</p>	<p>Abstract</p> <p>Sustainability in Small and Medium Enterprises (SMEs) in Pakistan is consistently challenged because of the absence of adequate financial resources, poor innovation potential, and inadequate institutional support for adopting sustainable practices. This study investigates the mediator role between Green Finance (GF) and Sustainable Entrepreneurship (SE) in the process of Green Innovation (GI). The study used a quantitative research design with a sample of 388 employees from SMEs, and the proposed relationships were tested using structural equation modeling (SEM) with Smart PLS 4.0 software. The results indicate that the relationship between GF and SE is partially mediated by GI, and that GF has a significant positive effect on both measures. The results of this study are confirmed by the Resource-Based View (RBV), which emphasizes the need for a combination of access to financial resources and innovative capabilities in order to nurture entrepreneurship for sustainability. It also offers financial and policy implications for policymakers, financial institutions, and SME managers, highlighting the need to link financial instruments to innovation strategies for fast-tracking sustainability transitions. The study contributes to the literature by integrating finance, innovation, and entrepreneurship into a cohesive framework within the SME context of a developing economy.</p>
<p>Keywords:</p>	<p>Green Finance, Sustainable Entrepreneurship, Green Innovation, SMEs, PLS-SEM</p>



1. Introduction

Sustainable Entrepreneurship (SE) has emerged as a critical pathway for solving global problems like resource depletion, climate change, and social inequality (Odeyemi *et al.*, 2024; Anser *et al.*, 2025). In Pakistan, environmental degradation, energy crises, and instability in the economy coexist, which means that sustainable business models are not a necessity for long-term development (Ali *et al.*, 2024; Naeem *et al.*, 2025). The SMEs of Pakistan constitute over 90% of the businesses of Pakistan, mostly face financial constraints, lack technological resources, and restricted access to the green infrastructure (Durrani *et al.*, 2024; Anser *et al.*, 2024; Shaikh *et al.*, 2025; Bohio *et al.*, 2025; Sial *et al.*, 2025; Shahab *et al.*, 2025). The above problems hinder their ability to adopt environmental and sustainable practices. GF includes the specific loans, subsidies, and investment promotions for the green programs, and offers a practical solution to narrow this gap (Nasir *et al.*, 2024). It allows the SMEs of Pakistan to invest in environmental clean technologies, enhance operational productivity, and comply with environmental rules. However, financial accessibility is not sufficient; the transformation from traditional to the SE relies on the capacity of the firm to innovate (Teece *et al.*, 2018; Farooq & Ahmad, 2023; Farooq *et al.*, 2023). The GI plays a central mediating role, allowing the firms to convert their financial resources into eco-friendly outputs by implementing green processes, green products, and waste-minimizing technologies (Cui *et al.*, 2025). In the Pakistani environment, where pressure is growing, and global trade is enhancing the favor of sustainability, the cooperation between GF and innovation is fundamental for the SMEs striving to maintain a competitive advantage and be socially responsible (Sadiq *et al.*, 2022).

While sustainability has become an increasing concern globally, the empirical connection between the concepts of GF and SE is yet under-researched in emerging markets such as Pakistan (Faheem *et al.*, 2024). Although GF is presented as a driver for sustainable development, the literature that addresses GF is mostly macroeconomic in nature and does not focus on the impact of GF at the firm level, especially in entrepreneurial ecosystems. A few studies (Odeyemi *et al.*, 2024; Mondal *et al.*, 2022) have meticulously investigated if GF access leads to sustainable entrepreneurial outcomes, including the development of environmentally friendly products, resource efficiency, and socially responsible business models. Furthermore, the internal capacity to convert financial support into sustainable practice is rarely taken into account in those that do. This highlights the need for further research, particularly in relation to Pakistani SMEs that might not have the in-house systems and expertise to benefit from the use of GF alone. In our study, GI is found to be an essential import relationship. Innovation is essential, or else, financial resources lead to mere conformity. Earlier research (Tekala *et al.*, 2024; Zhang *et al.*, 2024) has considered GF and GI as independent variables, rather than considering their combined effect on the SE. This study thus fills a major lacuna of the study by empirically testing the mediating role of GI between GF and SE in Pakistan. This mediation will be key for both scholars and practitioners seeking to design successful financing mechanisms that promote meaningful, enduring sustainability.

The main goal of this study is to investigate the effects from the perspective of SE in the context of Pakistan SMEs with special focus on the mediation role of GI. In addition to investigating the effects of green financial support on sustainable entrepreneurial behaviour, the study aims to explore how and to what extent GI can support this transformation. What is the extent of GF that affects SE in Pakistani SMEs? (2) What are the factors affecting the relationship between GF and SE in SMEs of Pakistan? (3) How does organizational culture affect SE in Pakistani SMEs? (4) How does organizational structure affect SE in Pakistani SMEs? (5) How does organizational leadership affect SE in Pakistani SMEs? (2) Does the relationship between GF and SE go through GI? In the Pakistani context, such questions come in handy, especially when SMEs are a significant player in the employment creation and economic growth, but are not able to function in an eco-friendly manner due to the lack of strategic and technological capabilities amongst them. SMEs are much more constrained than large companies when it comes to funding, and are therefore more vulnerable to the availability and effectiveness of green financing facilities. Moreover, the sustainability standards are becoming increasingly stringent, and SMEs in Pakistan often have to deal with informal or semi-formal setups, with limited access to international markets. Therefore, the present study adds value to the literature by incorporating the concept of GF and innovation in the framework of entrepreneurship and will also be useful for the practical application in enhancing the competitiveness and environmental responsibility of the SME sector in Pakistan.

The study is based on the RBV of the firm theory, which assumes that internal resources and capabilities of the firm should be valuable, rare, inimitable, and non-substitutable so that it can achieve sustainable competitive advantage (Ali *et al.*, 2022; Naeem *et al.*, 2024). About SE, GF becomes the outside financial resource that can be strategically used. But its uses are maximized only when combined with the internal capabilities, such as GI. The RBV concept helps to make it clear that every firm that receives a GF will need to ensure sustainable results: firms with a poor level of innovation potential can't turn financial resources into long-term benefits. As a responsive ability, GI allows companies to reorganise their assets and respond to the ecological challenge better, in line with customer expectations and legal obligations. This theoretical approach directly supports the objective of the study by clarifying the behavior that links the GF to the SE, and focuses on the internal capacities as a mediator. Moreover, RBV is

particularly suitable for SMEs in Pakistan, where the sources of competitive advantage are not easily available, and they rely on innovativeness and novelty to cope with the competitive environment. The study addresses some operational issues related to the difficulties of having limited resources in the SMEs, and the theoretical approach is based on the RBV, which suggests that the GF should be matched with the GI to achieve the SE results.

The study uses a qualitative research approach based on the positivist research philosophy, which assumes that social events can be impartially measured and analyzed using statistical procedures. A structured questionnaire was created on the basis of 5*Likert Scale and was utilized as the main instrument for information gathering. Overall, a total of 490 questionnaires were distributed among the employees of the SMEs across major cities of Pakistan, such as Karachi, Lahore, Faisalabad, and Islamabad. The study employed a convenience sampling method using both online and offline techniques, and achieved a response rate of about 79% (388 responses were received after a total of 490 responses were solicited). The data was initially analysed in SPSS, checking and cleaning for completeness and accuracy of data. The data analysis used was Smart PLS and the technique of Partial Least Squares Structural Equation Modeling (PLS-SEM).

This study makes a few contributions to the literature. It contributes to the knowledge base on the GF impact on the SE in SMEs from Pakistan in two ways: first, by extending its body of knowledge, and second, by contributing to the knowledge base of its local partners. Second, the study adds to the literature on the GI impact of the GF. Thirdly, this study will make a contribution to the literature on the GI impact on SE. Fourth, this study is a new theoretical contribution by empirically validating the mediating role of GI, which has been considered in a theoretical way with few empirical tests in the context of GF and entrepreneurship, especially in the context of South Asia. Finally, the study validates the relevance of the RBV when applied to the study of how resource-constrained firms can create sustainable competitive advantage through innovation.

The results of this study also have practical significance for policy makers, financial institutions, and business incubators, and it can spur the development of specific financial instruments and incentives for innovation for SMEs. The study also offers empirical evidence to support the development of green SME policies in Pakistan, which are essential to achieve broader environmental goals outlined in the sustainable development policy of Pakistan. These implications tend to show how to encourage stakeholders to foster eco-friendly entrepreneurship in limited-resource settings.

2. Literature Review

2.1 Theoretical Background

Previous research (Pasamar et al., 2023; Risi et al., 2023) on SE has investigated the role of external pressures and moral responsibilities in improving environmental performance using various theories, including the Institutional Theory, Stakeholder Theory, and the Triple Bottom Line. While these theories focus on compliance, legitimacy, and engaging with stakeholders, they fail to recognize the internal capacities that enable sustainable action. The RBV theory is best applicable in this study as it provides a strategic approach to the use of internal and external resources to gain a competitive advantage (Nayak et al., 2023). The theory raises an essential question in SE: how to transform access to resources into competitive and responsible business outcomes (Tate et al. 2018). Most of the SMEs in Pakistan are resource-constrained and unserved by institutions. RBV emphasises that SE requires more than just GF. The organisations need to have and build complementary capabilities (innovation) to make the best use of GF. The current study, RBV, is filling this gap between the availability of GF and the realization of SE by positing GI as a critical mediating resource. This makes RBV a direct theoretical foundation for the study's goals, as it provides a theoretical explanation for the relationship between financial inputs (GF) and entrepreneurial outputs (sustainability) through the firm's innovation capabilities.

2.2 Prior Evidence

2.2.1 Green finance: GF is financial investments to support environmentally friendly projects, such as renewable energy, energy efficiency, pollution control, sustainable agriculture, and green infrastructure (Nasir et al., 2024). After the 1992 United Nations Earth Summit, GF became a more prominent topic and was further institutionalized with the introduction of green bonds in the mid-2000s (Kathiarayan et al., 2024). In recent years, it has been recognized as a strategic tool for aligning financial systems with environmental goals, especially in the context of the Paris Agreement and the UN Sustainable Development Goals (SDGs).

2.2.2 Sustainable entrepreneurship: SE is the ventures that focus on profitability with environmental and social objectives as well (Miah et al., 2024). SE emerged in the early 2000s, building upon earlier work in ecological economics and social entrepreneurship. Sustainable entrepreneurs focus on creating long-term value for multiple stakeholders, including society and the environment (Veleva et al., 2021).

2.2.3 Green innovation: According to Hayat *et al.* (2024), GI is the development and implementation of new products, processes, and practices that reduce environmental harm and promote resource efficiency of the firms.

2.3 Hypotheses Development

2.3.1 Green Finance and Sustainable Entrepreneurship

GF is an important extrinsic support that enables enterprises to embed sustainability into their business models. It includes (i.e., low-interest rate loans, green bonds, subsidies, and environmental grants) that reduce monetary limitations for businesses intending to apply eco-friendly practices. SMEs in Pakistan, penetrating similar targeted financial resources, can mean the difference between embracing sustainable practices and continuing with traditional, environmentally adverse processes. Several studies (Li *et al.*, 2024; Wang *et al.*, 2024) have suggested that GF positively affects firm-position sustainability issues by making it economically doable to invest in renewable energy, energy-efficient instruments, and environmentally certified materials. Also, the attainability of GF frequently signals institutional support, boosting confidence among entrepreneurs to align their business strategies with the aims of sustainability.

For Pakistani SMEs, financial constraints are a basic rationale for the limited embrace of SE practices in businesses. These businesses lack the reserves or access to conventional financing channels to pursue long-term environmental aims. GF fills this gap by offering purpose-driven financial tools, therefore enhancing its capacity to design and apply sustainable results. It enables them to experiment with indirect business models, reduce environmental footprints, and tap into emerging green markets. Similarly, GF doesn't simply act as a funding source but also acts as a strategic enabler of value-grounded entrepreneurship. Thus, based on the above arguments, we formulated the following hypothesis;

H1: Green financing has a significant effect on sustainable entrepreneurship.

2.3.2 Green Innovation and Sustainable Entrepreneurship

GI plays a pivotal part in shaping how enterprises acclimate to environmental challenges and align with sustainable business aims. It involves reanalyzing traditional business models and embracing eco-friendly results such as clean technologies, green product designs, waste-reduction strategies, and energy-effective product systems. GI directly contributes to SE by allowing enterprises to meet regulatory norms, gain access to eco-conscious markets, and build brand loyalty among environmentally aware consumers. According to Krara *et al.* (2025) and Peng *et al.* (2024), innovative capabilities are important tools for entrepreneurs to produce long-term environmental and profitable value for businesses. Through continuing invention, enterprises are more equipped to induce results that are not only profitable but also beneficial to society and the ecosystem.

For Pakistani SMEs, GI is critical in addressing the country's environmental vulnerabilities, such as air pollution, energy deficiencies, and water failure. These enterprises constantly operate under resource limitations and need to introduce creativity to contend with rising sustainability prospects. GI enables them to produce locally applicable, cost-effective, and eco-sensitive results. By developing and enforcing GI, entrepreneurial ventures can enhance their adaptability, reduce functional pitfalls, and produce a competitive edge in environmentally conscious markets. Thus, based on the above arguments, we formulated the following hypothesis;

H2: Green innovation has a significant effect on sustainable entrepreneurship.

2.3.3 Green Financing and Green Innovation

While GI is frequently considered an internal capability, it's largely influenced by the accessibility of fiscal resources. GF provides the capital demanded to support R&D, acquire clean technologies, train human resources in sustainable approaches, and apply environmentally sound functional systems. For SMEs, similar financing enables them to go beyond introductory compliance and invest in innovative practices that have long-term environmental benefits. Former studies (Agrawal *et al.*, 2024; Tavares *et al.*, 2024) have demonstrated that enterprises with access to targeted GF are more likely to introduce practices similar to waste minimization, pollution control, and renewable energy operation. This highlights the catalytic role of GF in stimulating organizational knowledge and innovation.

The role of GF becomes even more crucial in Pakistan, where traditional sources of funding for environmental projects are limited and innovative solutions are desired. These businesses often require venture funding, government research and development grants, or transnational GF to launch changeover via invention, and thus are important triggers for a changeover via GF. Through fiscal risk reduction of new technology and sustainable trials, GF creates a culture of creativity and environmental problem-solving in



enterprises. It not only enables products and processes to be invented, but it also enables organizational strategies to be invented that promote sustainability. To this end, the next hypothesis is formulated:

H3: Green financing has a significant effect on green innovation.

2.3.4 Green Innovation Mediates Green Financing and Sustainable Entrepreneurship

The effect of GF on SE can be mediated by the intermediary role of GI, and can be more pronounced. The RBV suggests that resource availability is not sufficient to achieve sustainable performance unless enterprises possess the capabilities to convert resources into strategic assets. GI is this transformational capability and is the vehicle that turns financial inputs (GF) into sustainable entrepreneurial activities. This indicates that GI is caused by GF, which further promotes SE. Previous empirical studies (Akhtar et al., 2024; Mthombeni et al., 2024) confirmed that innovation is a mediator in many sustainability relationships, but limited research has empirically explored the role of innovation in the relationship between SMEs and sustainability promoted in emerging economies.

The mediation role played by GI is particularly important in the Pakistani context because of structural and operational problems of the SMEs. Financial inclusion is increasing, with green loan programmes and environmental grants, yet there are still businesses that have difficulties in using these funds for sustainable actions. This is where innovation comes in, as it allows the development and implementation of environmentally friendly processes, eco-friendly products, and sustainable business models. SMEs that interact with green finance are more inclined to shift from "compliance" to "proactive sustainability leadership" by innovating. SMEs that are able to innovate with green finance will be more likely to move from "compliance" to "proactive sustainability leadership". This change is crucial for long-term impact and is in line with the goal of the study: To learn about the mechanisms connecting financial support to sustainability. This theoretical and empirical thinking leads to the formulation of the final hypothesis:

H4: Green innovation significantly mediates the relationship between green financing and sustainable entrepreneurship.

2.4 Conceptual Framework

This study's conceptual framework is given below in Figure I.

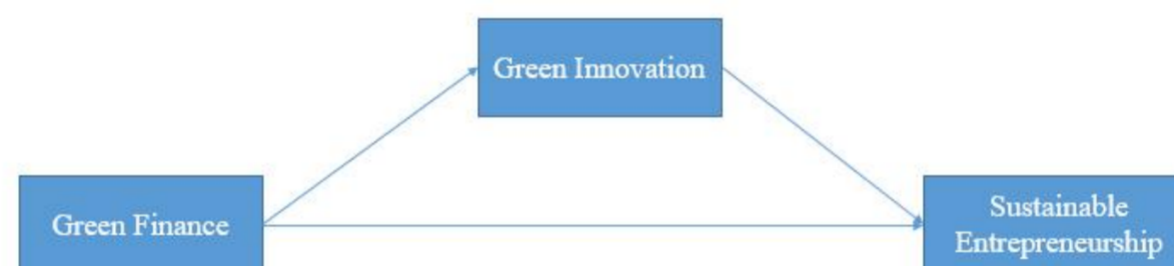


Figure I

3. Research Methodology

3.1 Research Design

The method of the study was primary data, a quantitative method, and a cross-sectional design. This is a design that can be used to test several relationships at once and is suitable for research that attempts to generalize results to a larger population. It was decided to use the survey strategy because it was efficient for obtaining structured responses from a large number of respondents. The research philosophy applied in this research was positivist research. The positivist research philosophy is a philosophy that assumes that knowledge of the outside world is objective, measurable, and independent of the researcher. The research method used is deductive.

3.2 Population and Sampling Technique

The study would be based on the samples of employees of SMEs in different sectors in Pakistan, including the manufacturing and services sectors. A convenience sampling technique was employed to gather data. This technique is appropriate because information is readily available from populations.

3.3 Instrumentation and Measures

A structured questionnaire was developed to collect data based on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). The adaptation of GF is in line with the six items of Zhang et al. (2024) that show access to environmental funds and green investment incentives (Zhang et al., 2024). The GI is made up of 5 items concerning eco-efficient processes and green product development, adapted from (Baquero et al., 2025). SE was assessed using 6 items related to the environmental responsibility, social accountability, and long-term business viability, adapted from (Kiladze et al., 2024). A pre-test of the questionnaire was conducted with 30 respondents to check the clarity, reliability, and validity of the questionnaire.

The data collection procedure, cleaning, and analysis are summarized in the following sections of the chapter.

The data was gathered for two months, both online and offline. Data collected were cleaned in SPSS 26.0. Listwise deletion and normality check were performed to deal with missing data, outliers, and inconsistencies. The data were analyzed using the Smart PLS 4.0 software after being cleaned up.

4. Results

4.1 Demographic Result

From the above demographic results presented in Table I, it can be seen that a total of 388 respondents were sampled, with 56.7% of them being male and 43.29% of them being female respondents. Of the respondents, the 20-30 age group has the highest representation (30.92%), closely followed by the age group 41+ (22.68%), indicating the presence of a relatively young to mid-career workforce in Pakistan's SME sector. The most common level of educational qualification in terms of educational level was Master's (38.65%), followed by Intermediate (21.90%) and Matriculation (15.46%). This distribution indicates a relatively well-educated sample, with many having attended higher education, and thus being able to grasp and apply ideas of 'green financing', 'green innovation', and 'sustainable entrepreneurship'.

Table I: *Demographic Statistics*

Demographics	Frequency	Percentage
Gender		
Male	220	56.70%
Female	168	43.29%
Age		
20–30	120	30.92%
31–40	180	46.39%
41+	88	22.68%
Qualification		
Matriculation	60	15.46%
Intermediate	85	21.90%
Bachelors	55	14.17%
Masters	150	38.65%
PhD	38	09.79%
Total	388	100.0%

4.2 Reliability and Validity

The findings in Table II support the reliability and validity of the measurement model of the constructs: GF, GI, and SE. Items have high factor loadings (above 0.70) for all retained items, suggesting that the items are good measures of the constructs they represent. The Cronbach's alpha values for GF (0.793), GI (0.757), and SE (0.720) are greater than 0.70, indicating internal consistency reliability. Similarly, the Average Variance Extracted (AVE) for all constructs (GF = 0.597, GI = 0.607, SE = 0.643) has been met with the minimum acceptable value of 0.50, indicating strong convergent validity, and the Composite Reliability (CR) for all constructs (GF = 0.829, GI = 0.824, SE = 0.837) is also above the minimum acceptable value of 0.70.

From a collinearity diagnostics perspective, Variance Inflation Factor (VIF) values for all indicators are also low and under the 5.0 threshold, with values ranging from 1.109 to 2.439. This means that there is no critical multicollinearity between indicators, which ensures that the structural path estimates will not be biased due to the redundancy of indicators.

Table II: *Discriminant Validity*

Items retained	Abbreviation	Factor Loadings	Cronbach's alpha	CR	AVE	VIF
Green Finance	GF1	0.820	0.793	0.829	0.597	1.393
	GF2	0.799				1.367
	GF3	0.800				1.291
	GF4	0.795				2.439
	GF5	0.739				1.204
	GF6	0.759				1.226
Green Innovation	GI1	0.802	0.757	0.824	0.607	2.203
	GI2	0.770				1.109
	GI3	0.754				1.535
	GI4	0.763				1.307
	GI5	0.826				1.226
Sustainable Entrepreneurship	SE1	0.854	0.720	0.837	0.643	2.063
	SE2	0.707				1.254
	SE3	0.720				1.209
	SE4	0.829				1.363
	SE5	0.793				1.127
	SE6	0.764				1.229

The results of the HTMT ratio and Fornell–Larcker criterion validate the discriminant validity of the model constructs GF, GI, and SE. All values in the HTMT matrix are less than the conservative threshold of 0.85 (GF–GI = 0.539, GF–SE = 0.423, GI–SE = 0.509), which means that each construct is empirically different from the other constructs. Moreover, the Fornell–Larcker matrix reveals that the square root of the AVE for each construct (GF = 0.547, GI = 0.527, SE = 0.439) values are higher than the correlation of each construct with other constructs, further supporting the discriminant validity. The results indicated that respondents showed distinction between the GF practices, innovation activities, and entrepreneurial sustainability efforts, which indicates the model measurement was robust.

Table III: *Heterotrait-Monotrait ratio (HTMT) matrix*

	GF	GI	SE
GF			
GI	0.539		
SE	0.423	0.509	

Table IV: *Fornell–Larcker criterion matrix*

	GF	GI	SE
GF	0.547		
GI	0.427	0.527	
SE	0.374	0.276	0.439

4.3 Hypothesis Testing

The direct effect results indicate that the study variables are positively and significantly related. The increase in access to green financial resources is correlated with increased SE because of increased access to GF. SE also has a strong influence on GI, as it shows that innovative initiatives related to environmental performance have a positive impact on entrepreneurship with a sustainability agenda. The association between GF and GI is also important, implying that GF is an important factor influencing the innovation process in

firms. Moreover, the full model of the study indicates that GI partly mediates the relationship between GF and SE, reinforcing the idea that GF not only impacts SE directly but also indirectly by enabling innovative environmental strategies.

Table V: Direct Effect

Path	Path Coefficient	T-Statistics	P-value	Hypotheses Decision
GF → SE	0.32	4.88	0.000***	Supported
GI → SE	0.41	5.73	0.001***	Supported
GF → GI	0.47	6.02	0.002**	Supported
GF →GI→ SE	0.19	3.97	0.000***	Supported

5. Discussion of Results

The H1 proposed that GF positively influences SE. These findings are aligned with Rajapakse *et al.* (2022), which confirms that access to green credit, low-interest eco-loans, and sustainability-linked financial instruments empowers SMEs to pursue environmentally responsible business models. The RBV theory also supports these findings, which suggest that access to GF provides firms with a strategic advantage to engage in sustainable practices. In SMEs of Pakistan, where limited financing options often limit innovation, GF plays a pivotal role in sustainable entrepreneurial efforts.

The H2, which examined the effect of GI on SE, also has a significant positive effect. This finding is consistent with the fact that companies that perform eco-friendly innovations (cleaner production techniques or energy-efficient solutions) are more prone to use SE strategies. This finding is in line with that of Bari *et al.* (2024), who concluded that firms that focus on sustainability innovation improve their agility and long-term competitiveness. This relationship is in line with the RBV theory, which states that environmental innovations form part of sustainable development, not only economically, but also environmentally and socially sustainable. For entrepreneurs in Pakistan, GI is a catalyst for connecting entrepreneurship with sustainability goals.

The H3 suggested that there will be a significant positive relationship between GF and GI. The relationship implies that financial assistance is given to green projects, resulting in product design, processes, and technology innovations in relation to environmental goals. The finding is in line with Akhtar *et al.*'s (2024) study, which emphasized that GF act as facilitators for innovation in sustainability. The RBV theory is consistent with this finding, which indicates that the capability of a firm to build non-replicable and sustainable competencies is increased by the use of GF for innovation. This innovation gap is directly filled by GF in the SMEs of Pakistan, which don't fund R&D.

The H4 tested the mediation between GF and SE by GF-GI-SE. The mediation was supported with a significant indirect effect, meaning that GF not only affects SE directly, but also indirectly through mediation processes like GI. This is in line with the research of Li *et al.* (2025), which showed that innovation can be a key channel through which the relationship between finance and sustainability operates. The RBV reinforces these results, as it is the innovation capabilities that are boosted by the GF, and these, in turn, enable companies to generate sustainable value. The study highlights the need for investing in innovation as an effective tool to convert financial investments into tangible, sustainable results for SMEs in Pakistan.

6. Conclusion

The purpose of the study was to examine the effect of mediator (GI) on SE in Pakistani SMEs. These study findings confirm that GF significantly positively influences the GI and SE. Further, the results indicate a significant mediating role for GI between the financial resources and SE, suggesting that financial resources are not enough; companies need to innovate to reach sustainability goals. The findings of this study are in line with the RBV theory, highlighting the importance of financial and innovative capacities in sustainable firm growth. Empirically, our research addresses the above gap and provides an understanding of the ways in which SMEs in emerging economies use green financial services to enhance SE. This study highlights the importance of integrated resource management in promoting environmentally responsible entrepreneurship in SMEs of Pakistan.

This research is significant in several aspects for the sustainability, finance, and innovation literature. First, it empirically confirms the mediation of GI between the relationship of GF and SE, which has not been sufficiently studied in previous studies. Second, it provides context-specific insights from an emerging economy like Pakistan, where SMEs are a significant contributor but do not have access to structured green financial resources. Third, the study utilizes and extends current theories, e.g., RBV, to a practical setting in the business world, thus adding to the value for academics and practitioners. Fourth, it provides empirical evidence with the use of powerful statistical methods like PLS-SEM, which is also methodologically rigorous. Finally, the provision of detailed information on the demographics and sectors assists in closing the knowledge

gap between theory and practice in entrepreneurship in developing countries.

This study is theoretically justifying and advancing the RBV as it shows how intangible assets, such as innovation, can connect the financial inputs to sustainable outcomes. In practice, the results have important policy, financial, and management implications. It is recommended that financial incentives be created that are tailored to green innovation. Financial institutions can create green lending products that are more specific and promote eco-entrepreneurship. The findings highlight the need to not only gain knowledge of green finance but also to use it in innovative processes and technologies to optimize the results of sustainability. Such a holistic view can provide SMEs with a competitive edge and support them in achieving global sustainability targets.

Although the study has made contributions, it has its limitations. Firstly, cross-sectional data are used, which restricts the study's power in terms of causal inference. Secondly, the convenience sampling technique used would limit the generalizability of the findings, even though it was a practical sampling method for SMEs. Third, the study is confined to SMEs in Pakistan, and the findings might vary for other emerging and developed markets. These limitations may be addressed in future studies through the use of longitudinal data to explore causal mechanisms. Furthermore, cross-country or cross-industry research may help to provide more in-depth insights regarding the role of contextual factors. Moving forward, other intervening or moderating factors like environmental regulations, organizational culture, or technological preparedness could further dissect the relationship between green finance, innovation, and sustainability.

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