Exploring the Impact of Green Practices, Green Dynamic Capabilities on Green Innovation: The Mediating Role of Green Value Co-creation in SMES

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Abstract. This study explores the relationships among green practices, green dynamic capabilities, green value co-creation, and GI within the context of small- and medium-sized enterprises (SMEs). Using a cross-sectional research design, data from 500 SMEs across five South Indian states were analyzed to examine these constructs' direct and indirect effects. The findings reveal that GP significantly and positively influence green innovation, underscoring the importance of sustainable operational strategies for fostering eco-friendly innovation. However, GDC exhibits a negative relationship with green innovation, suggesting potential trade-offs or challenges in leveraging these capabilities effectively. Furthermore, GVC was not found to mediate the relationship between GP and green innovation, nor was GP or dynamic a significant predictor of value co-creation. These results highlight the efficacy of direct strategies, such as adopting green practices, and collaborative approaches, in driving innovation within SMEs. This study contributes to the theoretical understanding of sustainability in SMEs and provides practical insights for managers, emphasizing the need to prioritize internal sustainability initiatives as a pathway to innovation. We then discuss the limitations and avenues for future research to further the dialogue on sustainability-driven innovation, including additional factors, such as government policies and technological advancements, and longitudinal studies.

Keywords: Green Practices, Green Dynamic Capabilities, Green Innovation, Green Value Co-creation, Sustainability, Small and Medium Enterprises (SMEs).

1. Introduction

1.1 Background and Context

Environmental concerns have created a climate of interest in green innovation and competitive advantages. This includes the causes of greenhouse effects, emissions, and resource deficiencies (Reuvers, 2015). This idea has been suggested by existing innovation management theories, corporate social responsibility, and management styles. The chronological development of the field, research trends, key drivers, and primary outcomes of GI in 618 papers were clarified through a bibliometric analysis (Albort-Morant et al., 2017). Researchers have proposed that to advance the study of green innovation, they establish a theoretical framework that, on the one hand, compiles the large body of literature existing on the topic and, on the other hand, provides a broad perspective that analyses its main principles and essential elements (Guinot et al., 2022).

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1.2 Research Problem

As the world becomes more environmentally conscious and sustainable, it is expected that small- and medium-sized enterprises (SMEs) will be pushed to adopt GP and innovate to perform well. GI refers to the creation of green products, processes, and business developments. This is especially important for SMEs, as it may help them keep pace with competition and fulfill stakeholders' expectations in the modern business environment. Even so, the road to GI is complicated and convoluted. Recognized as enablers of sustainability and GP (e.g., resource efficiency, waste reduction, and renewable energy adoption) within SMEs. However, their direct impact on building innovation capabilities in such contexts remains unclear. Green dynamic capabilities, that is, an organization's ability to sense, seize, and transform environmental changes in response to environmental changes, are also essential for undertaking changes in light of sustainability challenges. Nevertheless, we still do not know how much they have affected green innovation. Beyond this, GVC constitutes collaborative efforts among SMEs with customers, suppliers, and other stakeholders to create shared environmental and economic values. The mediating role of GVC in closing the gap be- tween green capabilities and innovation outcomes may help to close this gap. Howev- er, most existing studies are carried out on more significant enterprises or individual industries, thus leaving a significant information gap that focuses on how SMEs with resource-restricted enterprises and unique operational challenges can integrate these elements into greening innovation. Additionally, examining these relationships within a single period in a cross-sectional context is rare, preventing insights that reflect the circumstances faced by SMEs operating in dynamic and resource-constrained environments. Specifically, the second section of this research problem requires a more extensive investigation of how GP and dynamic capabilities drive GI in the context of SMEs, considering the mediation of green value co-creation. Tackling this problem will offer excellent insights for SMEs, more broadly targeting sustainable growth, innovation, and environmental goals.

1.3. Research Objectives

- Evaluate the impact of GP on green innovation.
- Examine the contribution of GDC to green innovation.
- Investigate the mediating role of GVC between these relationships.

1.4 Research Questions

- How does GP influence GI in SMEs?
- What is the effect of GDC on green innovation?
- Does GVC mediate these relationships?

2. Literature Review

2.1. Green Innovation

However, GI has become important for organizations to advocate sustainable development and competitive advantage. The components included here are green products, processes, services, and managerial and marketing innovations (Takalo et al., 2021). Research shows that GI strategy positively influences organizational identity and creativity, promoting GI (Song & Yu, 2018). Many studies on GI have been conducted since 1971, with research aimed at understanding its drivers and outcomes. GI lies in environmental pressures and challenges to corporations (Antecedents) and sustainable development capabilities and differentiation from competitors (Outcomes). Managers are encouraged to create a green organizational identity and creativity to enhance their firms' sustainable development capabilities when the topic becomes relevant (Song & Yu, 2018).

Instrument Questions:

- Our organization actively develops eco-friendly products and services to meet sustainability goals.
- We have implemented innovative processes to reduce environmental impact in our operations.
- Our organization prioritizes sustainability-driven innovations to maintain a competitive advantage in the market.

2.2 GP in SMEs

GP in SMEs are crucial for environmental sustainability and can improve financial and environmental performance. The motivators for implementing GP include organizational culture, expected consequences, and socioeconomic factors (Rekik & Bergeron, 2017). SMEs in developing nations show encouraging levels of green practice implementation, particularly in process optimization to reduce waste (Ramayah et al., 2013). Manager perceptions and attitudes correlate positively with GP (Yacob et al., 2013). Key GP include inventory management, waste treatment, and inbound logistics. However, SMEs face challenges in implementing green practices, necessitating institutional and policy support. Successful adoption of GP requires the commitment of owners and employees, coupled with government intervention, to promote and ensure sustainability (Dissanayake et al., 2019).

H1: GP positively influences green innovation.

H4: GP positively influences Green Value Co-creation.

Instrument Questions:

- Our organization actively adopts practices to minimize waste and reduce environmental pollution.
- We prioritize using energy-efficient technologies and renewable energy sources in our operations.
- Our organization encourages sustainable resource management, such as recycling and efficient use of materials.

2.3. Green Dynamic Capabilities

With these capabilities, organizations can integrate, build, and reconfigure resources to cope with environmental challenges (Dangelico et al., 2015). They consist of three key processes: external resource integration, internal resource integration, and resource building and reconfiguration (Dangelico et al., 2015, 2017).GI and eco-design capabilities are ordinary capabilities developed through these processes (Dangelico et al., 2017). Specifically, early-stage green ventures' dynamic capabilities are based on the micro-foundations of sensing, seizing, and reconfiguring capabilities (Hällerstrand et al., 2023).Internal motivations, such as environmental orientation and external forces, including green market turbulence, propel the development of green dynamic capabilities (Dangelico et al., 2015). Dynamic capabilities in the context of Green IT/S are linked to recognising the role IT/S can play in ecological sustainability and the extent to which it can contribute to environmental goals (Floreddu & Vitari, 2013).

H2: GDC positively influences green innovation.

H5: GDC positively influences Green Value Co-creation.

Instrument Questions:

- Our organization effectively senses opportunities to adopt sustainable and environmentally friendly innovations.
- We can seize and integrate emerging green opportunities into our business processes.
- Our organization is proficient in transforming resources and processes to align with sustainability goals.

2.4. Green Value Co-creation

Sustainable innovation and supply chain performance are significant strategies for green value co-creation. In other words, research shows that moral motives substantially affect green product innovation more than instrumental or relational motives (Chang, 2019). Supply chain partners can achieve optimal green investment sharing through various co-creation strategies, that can improve profits (Li et al., 2020). Value co-creation with partners in green supply chain strategies influences operations, innovation, and financial performance, and external pressure and internal support further strengthen these effects (Shi et al., 2020). For example, based on value co-creation frameworks, the Green Prescription Service of New Zealand identifies opportunities for improvement in collaboration and technology use in this case, and the extrinsic motivators of the patients (Villapol et al., 2018). These studies identified the drivers and resource properties for GVC strategies and the importance of using GVC strategies in different business sectors to stimulate sustainable innovation and performance (Chang, 2019; Li et al., 2020; Shi et al., 2020; Villapol et al., 2018).

H3: GVC mediates the relationship between GP and innovation.

Instrument Questions:

- Our organization collaborates with stakeholders (e.g., customers and suppliers) to develop sustainable and environmentally friendly solutions.
- We actively engage in partnerships to co-create value that benefits both environmental and business goals.
- Our organization involves stakeholders in decision-making to achieve shared sustainability objectives.

3. Research Methodology

3.1. Research Design

A quantitative research design with a cross-sectional approach was used in this study to investigate causal relationships between green practices, green dynamic capabilities, green value co-creation, and GI in small and medium enterprises (SMEs) using single-period data collection. The research design tests hypotheses from existing theoretical frameworks and offers insights into how sustainability-oriented strategies contribute to SME innovation.

Key Aspects of Research Design

- **Nature of the Study:** An explanatory approach was adopted to investigate the direct and indirect impacts of GP and dynamic capabilities on green innovation. The mediating role of GVC is emphasized.
- **Data Collection Approach:** SME managers and decision-makers conducted this cross-sectional survey simultaneously. This made it possible to focus only on the relationships between the variables investigated.
- **Target Population:** The empirical analysis in this study includes SMEs from the South Indian states of Andhra Pradesh, Telangana, Tamil Nadu, Karna- taka, and Kerala. To examine this variance, these states encompass a range of SMEs currently employing sustainability practices, thus making them the ideal population for this study.
- **Sample Size and Distribution:** The sample size was taken as 500 SMEs, of which a distribution of an equal number (i.e., 100) samples was collected from the five South Indian states. This means we

obtain representations from various industries and regional contexts in addition to a broader analysis.

- **Sampling Technique:** Random sampling is stratified to include each state's industry, business size, and sustainability maturity level.
- **Instrument Development:** A questionnaire structured in key sections will col- late relevant data.
- **Green Practices:** Measured by indicators of resource efficiency, waste reduction, and use of renewable energy after adaptation from validated scales.
- **Green Dynamic Capabilities:** Ten dimensions of sensing opportunities, seizing innovations, and transforming resources through which innovation is assessed.
- **Green Value Co-creation:** They evaluated through collaborative activities with stakeholders, such as customers, suppliers, and regulators.
- **Green Innovation:** The next topic discussed in this thesis is how patents are measured based on product, process, and business model innovations.

All constructs will be measured using a 5-point Likert scale ranging from "strongly disagree" to "strongly agree.

4. Results

4.1. Sample Distribution Analysis

State	Total	Micro	Small	Medium	Man. SMEs	Service SMEs	Trading SMEs	Agri. SMEs	Industrial SMEs	Service Sector SMEs
Andhra Pradesh	100	40	35	25	40	45	15	35	35	30
Telangana	100	35	40	25	40	40	20	30	35	35
Tamil Nadu	100	45	35	20	45	40	15	25	40	35
Karnataka	100	40	35	25	35	45	20	30	35	35
Kerala	100	40	35	25	40	50	10	30	35	35
Total	**500**	**200 (40%)**	**180 (36%)**	**120 (24%)**	**200 (40%)**	**220 (44%)**	**80 (16%)**	**150 (30%)**	**180 (36%)**	**170 (34%)**

The study's sample consists of 500 SMEs from five South Indian states—Andhra Pradesh, Telangana, Tamil Nadu, Karnataka, and Kerala—each state contributes an equal share of 100 samples. The sample includes 200 micro enterprises (40%), 180 small enterprises (36%), and 120 medium enterprises (24%), reflecting the typical dominance of smaller enterprises in the SME sector. Sectorally, manufacturing SMEs account for 200 samples (40%), while service SMEs lead with 220 samples (44%), followed by trading SMEs (16%), agricultural SMEs (30%), and industrial SMEs (36%), showcasing a diverse range of business activities. State-level variations are notable: Tamil Nadu has a higher share of micro-enterprises (45%) and manufacturing SMEs (45%), while Karnataka and Kerala display a strong focus on the service sector, with service SMEs comprising 45% and 50%, respectively. Telangana and Andhra Pradesh exhibit a balanced mix of manufacturing and agricultural SMEs, highlighting their dual focus on industry and agribusiness. This distribution ensures comprehensive coverage of SME diversity across enterprise sizes, industries, and regions, providing a robust foundation for analyzing green practices, dynamic capabilities, value co-creation, and innovation in South India.

4.2. Measurement Model

4.2.1. Reliability and validity assessment

The reported model fit indices demonstrate an excellent fit between the hypothesized structural equation model and the observed data. The Normed Fit Index (NFI = 0.973), Incremental Fit Index (IFI = 0.986), Tucker-Lewis Index (TLI = 0.981), and Comparative Fit Index (CFI = 0.986) all exceed the recommended threshold of 0.90, mostly surpassing the ideal threshold of 0.95, indicating a robust and well-specified model. Similarly, the Goodness-of-Fit Index (GFI = 0.971) and Adjusted Goodness- of-Fit Index (AGFI = 0.953) also exceed the recommended threshold of 0.90, con- firming that the model closely approximates the observed data while accounting for the number of estimated parameters. The Root Mean Square Error of Approximation (RMSEA = 0.045) is well below the cut-off of 0.06, reflecting minimal approximation error and excellent parsimony. Furthermore, the Relative Fit Index (RFI = 0.963 > 0.90) also highlights the adequacy of the model as the relationships are explained. These indices demonstrate that the structural equation model is robust, parsimonious, and has good data representation.

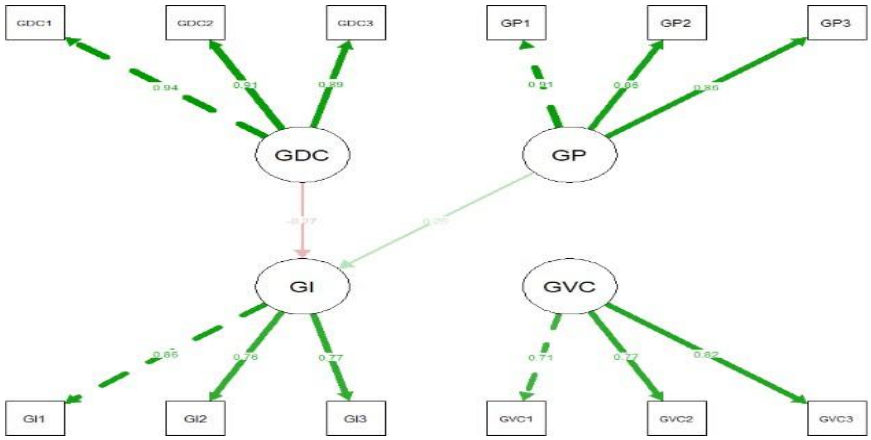
4.2.2. AVE

These Average Variance Extracted (AVE) values are reported for all constructs in the model, showing strong convergent validity across all constructs, with each AVE greater than the recommended threshold of 0.50. GI shows truly high convergent validity with an AVE of 0.84, which means that this variable explains a large portion of the variance of its indicators. The validity of the GVC construct is also strong at 0.77, with AVE implying good internal consistency in capturing the variance of its associated measures. GP also attains good convergent validity with an AVE of 0.64, which measures its ability to capture underlying indicators. Lastly, GDC is validated with an acceptable validity index of AVE 0.59, producing evidence of its ability to measure its construct. Our results verify that all the constructs have been well specified and that they explain the variance in their indicators sufficiently to assure the robustness of the measurement model.

4.2.3. CR

The correlation matrix indicates strong discriminant validity, as the square roots of AVE for all constructs—GI (0.797), GDC (0.915), GVC (0.769), and GP(0.878)—are more significant than their inter-construct correlations. This confirms that each con- struct is distinct and captures unique variance. The correlations between constructs are generally weak or negligible, with the highest being a weak positive correlation between GI and GP (0.247), suggesting a limited relationship. Other correlations, such as between GDC and GVC (0.011) or between GP and GVC (0.001), are nearly zero, indicating no significant linear associations. These results validate the measurement model's robustness and the constructs' ability to measure distinct aspects of the conceptual framework. However, the weak correlations suggest a need to explore potential non-linear or moderated relationships in future analyses.

4.2.4. Structural Model



4.2.4.1. Hypothesis Testing Using SEM

Hypothesis	Estimate	Standard Error (SE)	t-Value	p-Value	Results
H1	0.232	0.045	5.101	0.000	Accepted
H2	-0.236	0.042	-5.587	0.000	Accepted
H3	0.012	0.056	0.219	0.827	Rejected
H4	0.009	0.041	0.224	0.823	Rejected
H5	0.000	0.044	0.009	0.993	Rejected

The results of the hypothesis testing provide insights into the relationships among green practices, green dynamic capabilities, green value co-creation, and green innovation. Here is the interpretation of each hypothesis:

H1: The hypothesis is accepted with a significant positive effect (Estimate = 0.232, t

= 5.101, p = 0.000). This indicates that GP is critical in enhancing green innovation, demonstrating that sustainable practices such as resource efficiency and waste reduc- tion directly contribute to innovative outcomes in SMEs.

H2: The hypothesis is accepted, but the relationship is negative (Estimate = -0.236, t

= -5.587, p = 0.000). This suggests that while GDC is statistically significant, its in- fluence on GI is inversely

related. This may imply that certain aspects of dynamic capabilities might create challenges or trade-offs in fostering innovation.

H3: The hypothesis is rejected as the mediating effect is not statistically significant (Estimate = 0.012, t = 0.219, p = 0.827). This implies that GVC does not significantly mediate the relationship, indicating that the direct influence of GP on innovation is more potent than any potential indirect effect through value co-creation.

H4: The hypothesis is rejected due to a non-significant relationship (Estimate = 0.009, t = 0.224, p = 0.823). This indicates that GP does not substantially enhance the process of green value co-creation, suggesting that collaboration with stakeholders may not be directly influenced by sustainable practices alone.

H5: The hypothesis is rejected as the relationship is statistically insignificant (Esti- mate = 0.000, t = 0.009, p = 0.993). This suggests that GDC does not significantly contribute to co-creating green value, potentially highlighting the need for other mediating factors or enablers.

5. Discussion

5.1 Key findings

- The study reveals that green practices, such as resource efficiency and waste re- duction, significantly and positively influence green innovation. This finding underscores the importance of adopting sustainable operational practices as a direct driver of innovation within SMEs. By focusing on green practices, SMEs can enhance their ability to develop eco-friendly products, processes, and business models, contributing to environmental and economic benefits.
- An unexpected finding of the study is the negative relationship between GDC and green innovation. Although statistically significant, this inverse relation- ship suggests potential trade-offs or challenges when leveraging dynamic capabilities for innovation. These capabilities, which involve sensing opportunities, seizing innovations, and transforming resources, may introduce complexities that hinder innovation in specific SME contexts. Further investigation is needed to understand the factors contributing to this negative influence.
- The study also highlights that GVC does not mediate the relationship between GP and innovation. This indicates that the direct impact of GP on innovation is more potent than any indirect effect through collaborative value creation. Similarly, there is no significant relationship between GP and green value co-creation, suggesting that adopting sustainable practices alone may not directly lead to collaborative efforts with stakeholders.
- Additionally, the findings show that GDCs do not significantly influence green value co-creation, indicating that these capabilities may not inherently drive collaborative processes with stakeholders to create shared environmental and economic value. This raises questions about the practical utility of these capabilities in fostering stakeholder collaboration for sustainability outcomes.

5.2. Implications

5.2.1. Theoretical: Contribution to the literature on sustainability and SMEs.

The direct and indirect relationships among the key constructs of green practices, green dynamic capabilities, green value co-creation, and GI are examined, contributing significantly to SMEs' sustainability theory. Previous research has mainly studied large enterprises. However, this study highlights SMEs, which typically operate under resource constraints and feature different organizational dynamics. First, the study reaffirms the importance of GP to green innovation. This aligns with the Re- source View (RBV) regarding how sustainable operational practices can be made into valuable organizational resources, such as co-

creation and green innovation. While previous research has primarily focused on large enterprises, this study emphasizes the unique context of SMEs, which often operate under resource constraints and have distinct organizational dynamics.

- The study confirms the critical role of GP in driving green innovation, aligning with the Resource-Based View (RBV) by demonstrating that sustainable operational practices can serve as valuable organizational resources. However, finding GDC negatively related to GI contradicts conventional assumptions of the universal good of dynamic capabilities. Such is critical due to the complexity and potential tradeoffs in deploying these capabilities in re- source-constrained settings such as SMEs.
- For a mediating role of green value co-creation, no significant impact on intra- firm collaboration emerges, making for a unique addition to the literature on stakeholder collaboration, indicating that direct innovation strategies could outperform collaborative strategies in some SME contexts. En innovation. While previous research has primarily focused on large enterprises, this study emphasizes the unique context of SMEs, which often operate under re- source constraints and have distinct organizational dynamics.
- The study confirms the critical role of GP in driving green innovation, aligning with the Resource-Based View (RBV) by demonstrating that sustainable operational practices can serve as valuable organizational resources. However, the finding of a negative relationship between GDC and GI challenges conventional assumptions about the universal benefits of dynamic capabilities. This highlights the need for further research to examine the complexities and potential trade-offs associated with deploying these capabilities in resource- constrained settings like SMEs.
- The absence of a significant mediating role for GVC adds a new dimension to the discourse on stakeholder collaboration, suggesting that direct strategies for innovation may outperform collaborative approaches in specific SME contexts. The findings of this research add to the literature and suggest how SMEs may integrate sustainability and innovation, enabling a more comprehensive exploration of these dynamics in future research.

5.2.2. Practical: Strategies for SME managers to enhance green innovation.

The study benefits SME managers looking to improve GI in their organizations. This also suggests that incorporating sustainable practice into daily operations has a dis- tinct positive impact on green innovation. To foster eco-friendly product and process innovations, SME managers should focus on resource optimization, waste reduction, and renewable energy adoption. Given that the relationship between GDC and GI is negative, managers should be cautious when deploying those capabilities. In green innovation, it underscores the importance of embedding sustainable practices into daily operations. To foster eco-friendly product and process innovations, SME man- agers should focus on resource optimization, waste reduction, and renewable energy adoption.

- Given the negative relationship observed between GDC and green innovation, managers should approach the deployment of these capabilities with caution. In developing sensing, seizing, and transforming capabilities, some effort should be made to ensure that this happens in line with the organizational priorities and resources to avoid overwhelming the enterprise and creating redundancies. Managers could integrate dynamic capabilities and innovation goals through training and capacity-building programs. Second, the study suggests that instead of collaborative strategies (green value co-creation), direct investments in GP may lead to better innovation outcomes. Innovation underscores the importance of embedding sustainable practices into daily operations. To foster eco-friendly product and process innovations, SME managers should focus on resource optimization, waste reduction, and renewable energy adoption.

- Given the negative relationship observed between GDC and green innovation, managers should approach the deployment of these capabilities with caution. Efforts to develop sensing, seizing, and transforming capabilities must be aligned with organizational priorities and resources to avoid overburdening the enterprise or creating inefficiencies. Training and capacity-building pro- grams could help managers integrate dynamic capabilities with innovation goals.
- The study suggests that direct investments in GP may yield better innovation outcomes than relying solely on collaborative strategies such as green value co-creation. Although a stakeholder approach will continue to play a role, managers should focus on internal operational improvements as a basis for innovation. Stakeholders can then be leveraged selectively to work collaboratively to address specific challenges and opportunities. Finally, managers should be data-driven and monitor the effect of sustainability initiatives on innovation performance. The impact of GP on GI underscores the im- portance of embedding sustainable practices into daily operations. To foster eco-friendly product and process innovations, SME managers should focus on resource optimization, waste reduction, and renewable energy adoption.
- Given the negative relationship observed between GDC and green innovation, managers should approach the deployment of these capabilities with caution. Efforts to develop sensing, seizing, and transforming capabilities must be aligned with organizational priorities and resources to avoid overburdening the enterprise or creating inefficiencies. Training and capacity-building pro- grams could help managers integrate dynamic capabilities with innovation goals.
- The study suggests that direct investments in GP may yield better innovation outcomes than relying solely on collaborative strategies such as green value co-creation. While stakeholder engagement remains important, managers should prioritize internal operational improvements as a foundation for innovation. Collaborative efforts with stakeholders can then be leveraged selectively to address specific challenges or opportunities.
- Lastly, managers should adopt a data-driven approach to monitor and evaluate the impact of sustainability initiatives on innovation performance. If managers align their strategies to their SME's unique needs and constraints to balance sustainability and innovation, a long-term competitive advantage can be achieved while contributing to environmental goals.

6. Conclusion

6.1. Summary of Findings

The study identifies several important findings. My first result is that resource efficiency, waste reduction, and renewable energy adoption positively and significantly impact green innovation. This highlights the need to integrate sustainability into daily operational practices to develop eco-innovations. Second, the negative link between GDC and innovation was unexpected. Although these capabilities are statistically significant, their converse indicates possible tradeoffs (or challenges) to take ad- vantage of the capabilities in the resource-constrained SME environments. The discovery provides an incentive to investigate further what factors might limit the effectiveness of dynamic capabilities as a vehicle for innovation. Third, the study finds no significant mediating effect of GVC in the relationship between GP and innovation. Like green value co-creation, neither GP nor GDC significantly moderates them. These results mean that stakeholder collaboration may not be the prime force motivating SME innovation, and this implies that direct strategies that emphasize internal improvements may be most successful.

6.2. Limitations

While the study served its purpose, it was not without its limitations. A cross- sectional design prevents observing the dynamic changes in the relationships between the constructs over time. With a longitudinal approach, more insights can be generated regarding the evolution of these relationships. The results will not be generalized to other regions or countries because the geographic scope is limited to SMEs in South India only. Cultural, economic, or regulatory differences may limit the applicability of the results. It also deals with specific constructs such as green practices, dynamic capabilities, value co-creation, and innovation, which are then isolated from other possible significant parts like government policies, market competition, etc., or technological advancements. The possibility of response biases to self-reported data from SME managers makes this a potential hindrance to the accuracy of the results. In addition, the study only analyzes mediation and moderation without answering what other mediators or moderators (e.g., organizational culture or financial resources) may have impeded the causal relationships.

6.3. Future Research Directions

Several approaches for future research can also be used to build upon the findings and address the study's limitations. The relationships between green practices, dynamic capabilities, value co-creation, and innovation (in terms of process and product innovation) could be explored using longitudinal studies to understand causation and develop an understanding of dynamic effects. However, the geographic scope could include SMEs in other regions or countries, which would help generalize the findings. Cross-industry studies could identify industry-specific distinctiveness about sustainability and innovation strategies. One can incorporate other factors like government policies, financial incentives, and technological advancement to understand better what drives green innovation. More research could also be directed at behavioral and psychological factors such as managerial attitudes, organizational learning, and employee engagement to determine internal dynamics affecting sustainability and innovation efforts. Finally, the role of mediation is explored in future studies investigating whether moderation can be established based on variables like organizational culture, leadership commitment, or financial resources. Combining quantitative approaches and qualitative methods like case studies or interviews could lead to richer insights into the complexities of sustainability-driven innovation in SMEs.

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