Remittances Review
June 2024,
Volume: 9, No: 3, pp.931-955
ISSN: 2059-6588(Print) | ISSN 2059-6596(Online)

Received: 28 May 2024, Revised: 29 June 2024, Accepted: 26 July 2024, Published:15 August 2024DOI: https://doi.org/10.33282/rr.vx9i2.49

The Green Revolution: How Green Innovation And Green Organizational Culture coverage to drive Sustainable Business Success

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Abstract:

Purpose This research delves into the relationship between green innovation and sustainable business performance in the manufacturing sector, with a particular emphasis on the mediating influence of green organizational culture. Green innovation, which includes environmentally friendly products, processes, and technology, is becoming more widely acknowledged as a key component in improving the sustainability of businesses. This research suggests that the relationship between green innovation and sustainable company performance is mediated by green organizational culture, which is defined by common values, attitudes, and behaviors promoting environmental sustainability.

Design/ Methodology /Approach Using standardized questionnaires, 229 mid-level manufacturing industrial workers contributed data for the study. Regression analysis and conformity factor analysis were employed together with SPSS and AMOS correlation to evaluate the data. Data from manufacturing companies using green technologies was gathered using a

quantitative technique, and the data was then evaluated to determine the direct and indirect effects on business performance outcomes.

Findings The findings show that sustainable business performance is significantly impacted by green innovation, with green organizational culture acting as a key mediating factor. According to this, developing a green organizational culture can increase the advantages of green innovation and result in better economic and environmental outcomes. The study adds to our knowledge of how organizational culture can improve the efficiency of green technologies and has applications for manufacturing companies that want to grow sustainably by implementing environmental strategies.

Originality/Value There are implications for theory as well as practice. In light of complexity and diversity, future research goals and management implications are provided to help green innovation improve sustainable business performance.

Key words: Green Innovation, Green Organizational Culture, Sustainable Business Performance

Introduction:

Since the 2000s, the term "green" has gained popularity as awareness of environmental issues and sustainability has grown (Chen, Lai, and Wen 2006). Green innovation is innovation created by companies expressly to safeguard the environment during manufacturing and business operations, allowing them to be recognized as meeting their institutional obligations (Qu et al. 2022). In the meantime, green innovation strategies and their results give companies a long-term competitive edge and help them live up to societal expectations(Albort-Morant, LealMillan, and Cepeda-Carrion 2016). Green innovation practices can greatly boost the profitability of small businesses, despite the fact that they are typically thought to be exclusively relevant for large enterprises. The few studies that have examined small businesses and green innovation have demonstrated that small businesses that implement successful green innovation practices see higher profitability than those that do not (Lin et al. 2019).

Furthermore, it has been asserted that the efficacy of green innovation approaches is contingent upon the attributes of the enterprises, as opposed to their magnitude (Wysocki 2021). The development and operation of SMEs (small and medium-sized firms) depend on the

implementation of such initiatives. Since the growth of social media and globalization has raised public awareness of firms' social and environmental obligations, businesses need to operate more sustainably to preserve their place in the market, both nationally and internationally (Abbasi et al., 2022). A recent study on sustainable company performance focused on green product innovation in corporate resources and processes (Liu, et al., 2021). Organizations are giving green innovation and sustainable business practices top priority due to the growing concern for environmental sustainability (Abbas & Khan, 2023). Green organizational cultures enable firms to successfully adopt green innovation and achieve sustainable commercial performance by fostering a common commitment to environmental sustainability (Simpson et al., 2012).

The goal of this study is to investigate how GOC mediates the relationship between sustainable company performance and green innovation. Although there is minimal information in the original study about how green innovation affects sustainable business success. The conclusions of Zhao & Huang's study from 2022 are limited in their applicability to other locations with different geographical, economic, and climatic variables because they are based exclusively on data from manufacturing enterprises in China. Although a great deal of research has been done on the direct correlation between green innovation and sustainable company performance, less is known about the mediating function that green organizational culture plays in this relationship. Our research fills this vacuum by examining the role that green organizational culture plays as a mediator in the relationship between sustainable business performance and green innovation. By investigating this mediating effect, we hope to further the body of knowledge on sustainable business practices by providing a more thorough understanding of the internal organizational dynamics that lead to effective green innovation results.

Under the RBV framework, green innovation is transformed into a strategic resource. Businesses may develop innovative environmental solutions that satisfy client needs for sustainability while still adhering to rules by investing in green innovation. This in turn improves brand recognition, opens up new markets, and lowers costs through efficiency, all of which contribute to the overall performance of the company. By creating an atmosphere that is conducive to the growth of green innovation, green organizational culture serves as a mediator. Employee participation and support for green initiatives is more common in companies with a strong green culture, which

helps to ensure that green innovations are successfully adopted and expanded. Green innovations have a greater influence on the company's sustainable business performance because of this culture's assistance in integrating sustainability into the core operations of the business. According to the RBV theory, a green organizational culture acts as a mediator to increase the link between green innovation and sustainable business performance. This culture makes sure that innovation is continuously fostered, improved, and integrated into the business's operations rather than being an isolated endeavor, which results in long-term, sustainable performance.

Literature Review:

Green Innovation and Sustainable Business Performance:

International environmental rules, societal demands for ecologically friendly products, and worries about global warming and rising environmental contamination are all rapidly growing (Naghavi 2007). According to linked literature, innovations focused on the environment are referred to as green innovations (Soewarno, Tjahjadi, and Fithrianti 2019), (Garcıa-Machado and MartınezAvila 2019). Other concepts included in the study include eco-innovation (Cheng, Yang, and Sheu 2014), environmental innovation (Rennings and Rammer 2011), and sustainable innovation (Lopez-Valeiras, GomezConde, and Naranjo-Gil 2015), as well as sustainable innovation (Shen, Sha, and Wu 2020). Research emphasizes the significance of behavior change in businesses and their stakeholders with regard to environmental problems; the shifting organizational culture; the perceived organizational climate; and the fact that emerging innovations give businesses a competitive advantage (Olsen, Sofka, and Grimpe 2017). Various explanations have been offered using different concepts. Simultaneously, companies prioritize environmentally conscious activities that enable them to fulfill institutional objectives to safeguard the environment (Wang 2019). They also consider the practices of their environmentally conscious rivals in the market (Soewarno, Tjahjadi, and Fithrianti 2019).

Asadi et al. (2020) noted that the TBL model emphasized the significance of the economy, society, and environment as factors of business performance. According to Ali et al. (2016), a company's innovativeness and overall sustainable business's performance have a positive association. Additionally, Rajapathirana and Yui (2018) discovered a favorable association between SMEs' total performance and their level of innovation (Ali et al., 2020). Scholars

contend, however, that organizations prioritize the economic aspect over the social and environmental (Asadi et al., 2020). Every component is essential to the business's successful operations and business performance (Fernando et al., 2019). The environmental impact of a company's green initiatives is referred to as environmental performance, or ENP (Henriques and Sadorsky, 1996; Chen, 2008). By lowering environmental risks (such as air emissions and the frequency of landfill disposal), GRIN practices can improve a company's environmental performance and standing within the sector (Kammerer, 2009; Dangelico, 2013). Businesses that reduce their usage of hazardous chemicals, waste production, and carbon dioxide emissions are judged on their environmental performance (Asadi et al., 2020; Muangmee et al., 2021).

Businesses who outperform their rivals do gain from GRIN. Businesses typically participate in GRIN operations in order to facilitate a wide variety of transactions that meet the requirements and needs of possible purchasers. A company's financial status may improve as a result of higher sales volume (Chen, 2008; Caracuel and Ortiz-de-Mandojana, 2013; Zhang et al., 2020). Several studies indicate that financially, more inventive firms typically perform better. In addition to addressing environmental issues, GRINs are essential for boosting brand acceptability, enhancing communication, and retaining employees. Training employees can help to develop their human capital and influence them to adopt more environmentally friendly practices in their behavior and attitude (Huang et al., 2016). According to earlier studies, companies that perform sustainably also do better socially (SOCP; Asadi et al., 2020; Shahzad et al., 2020).

H1: Green innovation has positively associated with sustainable business performance.

Green Innovation and Green Organizational Culture:

When implementing innovation initiatives, organizational culture is vital (Kitchell, 1995). Organizational culture may either encourage or impede innovation. Green organizational culture, via guiding the organization and the employees, would ensure the successful adoption of green innovation (Howard-Grenville, 2006). The successful application of green innovation necessitates an environmental values-based culture. If not, the pursuit of green innovation may become less significant (Fernández et al., 2003). Furthermore, there is insufficient green innovation to be ensured by the senior managers' decisions to improve green environmental

performance. Green organizational culture should be regarded as the fundamental prerequisite for green innovation in a hotel since it offers a comfortable setting for green practices (Azzone & Noci, 1998).

An organization's actions are guided by a shared set of mental assumptions that are provided by its organizational culture (Chen, 2011a). Because the execution of green innovation activities is facilitated by the sharing of green values, green organizational culture plays a role in the development of green innovation. According to Chang (2015), organizational culture facilitates the adoption of green innovations and aids in members' comprehension of green practices. According to Baumgartner (2009), companies can improve their integration of environmental practices by developing a green organizational culture as part of their sustainability initiatives. In other words, an environment-oriented culture would make it easier to successfully implement environmental practices (Campbell, Ratcliffe, & Moore, 2013).

The industrial sector has been the focus of research on the connection between green innovation and green organizational culture, as opposed to the service sector. In the manufacturing sector, for instance, Chen et al. (2012) discovered a favorable correlation between green innovation and green organizational culture. Chang (2015) discovered favorable correlations between two variables in the manufacturing sector. The service sector has not yet looked at this kind of partnership. On the other hand, research indicated that different forms of innovation would benefit green organizational culture. For instance, Tajeddini and Trueman (2012) discovered that green organizational culture benefited from aspects of green innovation**.** Green innovation is significantly influenced by green green organizational culture, as the research flow demonstrates. The following hypothesis was formed in light of the aforementioned arguments:

H2: Green innovation has positive effect on green organizational culture.

Green organizational Culture and Sustainable Business Performance:

Studies have concentrated on developing the definition of GOC from the idea of organizational culture, as it is relatively new in the HR profession (Al Swidi et al., 2021) (Afum et al., 2020). The three aspects of GOC—degree, diffusion, and depth—that Harris and Crane (2002) examined provided an all-encompassing view of the green culture within the company.

According to the three aspects of GOC, Harris and Crane (2002) proposed that if a company adopts green practices, the changes will be significant. These factors imply that implementing green practices should not be limited to HR; rather, it should involve every employee in the company. According to Rao and Holt (2005), GOC can influence organizational members' thought processes and work as a catalyst for green transformation, which can give the company a competitive edge (Gurlek and Tuna, 2018). The company's competitive advantage stems from its green culture, which also helps it achieve more strategically in terms of sustainable performance (Muisyo et al., 2021).

According to Dangelico (2015), in order to solve environmental issues and ultimately increase organizational performance, organizations must make a deliberate effort to engage and develop every person of the organization. Muisyo et al. (2021) provided evidence that the GOC enablers—leadership emphasis, message credibility, peer involvement, and employee empowerment—form the basis for enhancing the firm's green competitiveness. These facilitators encourage staff members to concentrate on implementing green initiatives within the company, which lowers toxic emissions from organizational processes (Simpson and Samson, 2010) and ultimately boosts the company's performance (Roscoe et al., 2019). Shah et al. (2021) made the observation that GOC concentrates on changing employee behavior to solve problems that cause the organization to change. Gurlek and Tuna (2018) demonstrated that in order to achieve sustainable business performance, the organization should support each and every member. This gives the company a competitive advantage and helps to improve the degree, distribution, and depth dimension of green culture within the organization. In light of the conversation above, we put out the following hypothesis.

H3: Green organizational culture has positive effect on sustainable business performance.

The mediating effect of green organizational culture

According to a small number of studies, administrators' actions and attitudes have the potential to influence the business climate or culture (Van der Wal and Demircioglu 2020; Martin and Cullen 2006). A green organizational culture, according to Porter, Gallagher, and Lawong (2016), is an amalgam of presumptions, concepts, symbols, and artifacts within an organization that convey a

need or desire for the corporation to conduct its business in a way that is environmentally sustainable. Conversely, green culture can be defined as an organizational culture that prioritizes environmental concerns (Pham et al., 2018). Establishing goals, characterizing traits, and showcasing objects that represent the organization's requirements and aspirations with regard to environmentally sustainable operations are all part of the process of fostering a green organizational culture (Tahir, Athar, Faisal, Shahani, & Solangi, 2019).

It was suggested in the previous discussion of the connection between green innovation, green organizational culture, and sustainable business performance that these factors would boost sustainable business performance. This was confirmed by the results of the earlier research. The literature claims that a green organizational culture greatly enhances the performance of sustainable businesses (Chandra, 2021; Wang, 2019). While this seems obvious, studies by Tahir et al. (2019) and Rokhyadi, Haryono, and Untoro (2015) have demonstrated that green organizational culture and sustainable company performance have contradictory relationships. Because of this, it is unclear how green organizational culture and green organizational culture are related, and this relationship has to be further investigated by adding a mediator variable to the model. Green organizational culture is employed in relation to one another as a mediator between green innovation and sustainable business performance. To explain the relationship between these parameters, a statistical model has been constructed and tested in production contexts, as Figure 1 illustrates. Consequently, we put up the following hypothesis.

H4: Green organizational culture mediates the relationship between green innovation and sustainable business performance.

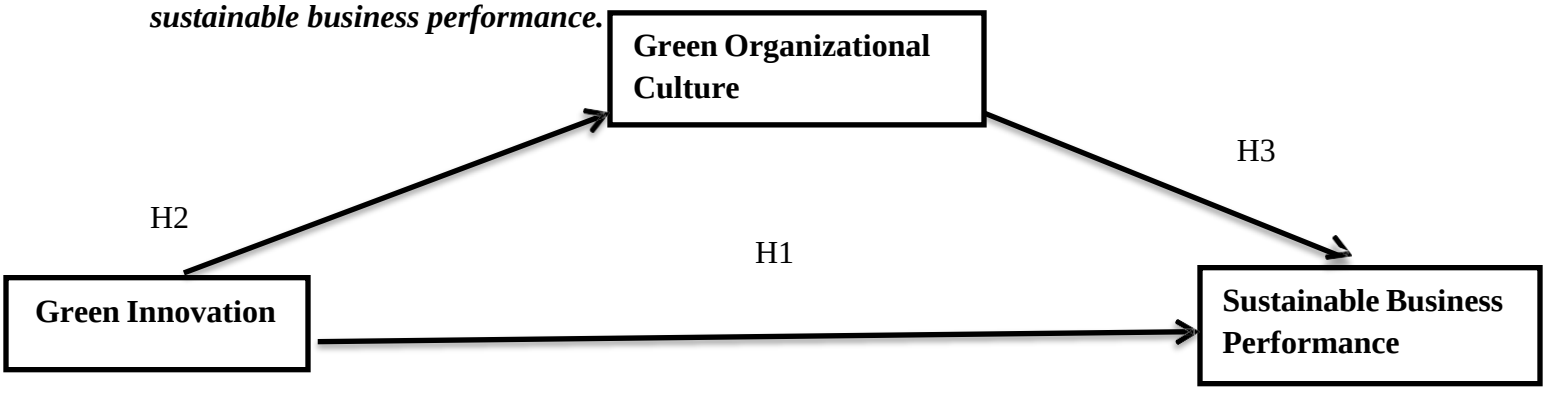

Figure 1: Research Model

Research Methodology:

Utilizing a survey-based research methodology, the proposed model was examined. The study focused on manufacturing enterprises, and managers and mid-level staff members were informed about the objectives and nature of the research (such as tobacco, fertilizer, sporting industry , food and drink, wood and furniture, textile, pharmaceutical, and surgical industry , among others). Data for this study were gathered using a nonprobability/nonrandom snowball sampling technique (Bryman and Bell, 2011). Referrals and favorable responses are two ways that respondents might help this sampling approach obtain a large sample. It also aids in minimizing costs and maximizing response rate in a brief amount of time (Bryman and Bell, 2011). Convenience sampling is a non-probability sampling method in which participants are chosen according to factors such as accessibility, closeness, or availability to the researcher. This approach is frequently employed when simple and quick data collecting is required, and it works especially well for pilot projects or exploratory research. Convenience sampling does have certain drawbacks, though, most notably the possibility of sampling bias because the sample might not be entirely representative of the whole population. The convenient sampling was used to collect data.

Measures:

The measurements employed in this study were taken from earlier research; each scale's specifics are provided below.

Green Innovation:

Taken from Bansal (2005) and modified. Song and Yu (2018) provided the six-item scale used to assess "Green Innovation" (GI), a crucial component of SD that can provide a competitive edge. GI is determined by answering the following questions on a 7-point Likert scale: 7 = Strongly Agree, 1 = Strongly Disagree. Some of the scale items include. My organization chooses the materials of the product that produce the least amount of pollution for conducting the product development or design and My organization uses the fewest amounts of materials to comprise the product for conducting the product development or design. Internal consistency was assessed using Cronbach's alpha, and the final result was 0.86.

Green Organizational Culture:

The degree, diffusion, and depth of cultural greening within an organization are the three dimensions provided 21 items scale used to access green organizational culture. The Aggarwal and Agarwala (2021) scale served as the model for the questionnaire containing these dimensions. On a five-point Likert scale, with 1 representing "strongly disagree" and 5 representing "strongly agree," the respondents were asked to identify their opinion. Some of the scale items include, In my organization, managers believe that focusing on environment-friendly policies and practices has a negative influence on the financial performance of the company and When short-run performance of the organization is considered, managers consider profit and growth as dominant objectives rather than green agenda. The value of Cronbach's alpha was 0.86.

Sustainable Business Performance:

Nawanir, G(2016) provided the five item liket-scale to assess sustainable business performance. The respondents were asked to rate their opinions on a five-point Likert scale, where 1 meant "strongly disagree" and 5 meant "strongly agree." Some of the scales include Net profit margin of our organization increased and Return on investment of our organization increased. The value of Cronbach's alpha was 0.95.

Analysis Section:

To test the hypothesis of this study, the analysis was divided into three parts. First, demographics, correlation and reliability of the scale were identified. Second, model fitness was confirmed, and the distinctiveness of the constructs was ensured through confirmatory factor analysis (CFA). Third, Path analysis was tested to test the hypothesis. Mediation was analyzed using Preacher and Hayes Model 4.

Results

Descriptive and demographic statistics:

The mean, standard deviation, and correlation of the variables are shown in Table 1. Since none of the correlation coefficients between the variables was more than 0.70, multicollinearity was

not present in the data. Additionally, the reliability ratings are shown diagonally, suggesting that the data was trustworthy and appropriate for additional examination.

The demographic analysis showed that there were 32.8% female participants and 67.2% male participants in the study. Of the overall workforce, 47.2% belonged to the 20–30 age group, 41.0% to the 31–40 age group, 35.9% to the 31–35 age group, and 11.8% to the 40–50 age group. Workers with less than a year's experience made up 23.6%, followed by those with two to five years,47%, those with five to ten years, and 3%t with ten years or more. In that group of workers were 1.3% college graduates, 39.3% bachelor's degree holders, 47.6% master's degree holders, 9.6% master's degree holders, and 2.2% holders of other degrees.

Conformity Factor Analysis

The scales were validated using validity and reliability. The reliability standards for the Cornbrash's alpha coefficient were determined to be adequate for each study variable. With the aid of Amos 22 software and confirmatory factor analysis (CFA), the convergent validity of the measuring items was assessed. The findings of the measurement model (see table 1) demonstrated that the study's data had excellent fit statistics, including CMIN/DF 2.3. Tucker Lewis Index (TLI) equals 0.88, while Comparative Fit Index (CFI) is 0.90. The Root Mean Square Approximation Error (RMSEA) is 0.07 and the Relative Fit Index (IFI) is.90. So we took action to test our hypothesis.

Measurement Model:

Table: 01

Models	CMIN/DF	REMSA	CFI	TLI	IFI
3 Factor Model	2.3	0.07	O.90	0.88	O.90

Statistical path analysis

Sustainable business performance benefits greatly from green innovation (H1). Table 3 displays the outcomes of the direct and mediation analysis. Preacher and Hayes (2005) model 4 was to test H1 & H2. The findings of the direct effect indicate a strong and favorable relationship between green innovation and sustainable company performance. ($p < 0.01$), $b = 0.42$,

supporting H1. Green innovation significantly improved green organizational culture, according to Preacher and Hayes (2005) (b = 0.44, P < 0.01). Green organizational culture is significantly impacted by sustainable business performance (H3). The outcomes of the direct and mediation analyses are shown in Table 2 was tested using Preacher and Hayes' (2005) Model 4.(b = 0.19, P < 0.01), thereby validating H3. Green organizational culture: the connection between green innovavtion and sustainable business performance (H4).
It was discovered that there is a substantial indirect relationship between green organizational culture and sustainable company performance (indirect effect = ~0.08, 95% LL = ~0.02, 95% UL = ~0.14).

Table 2: Correlation and reliabilities

Variables	**Mean**	**SD**	**1**	**2**	**3**
Green Innovation	5.7	1.0	*.86*		
Green Organizational Culture	4.0	.67	.68**	*.88*	.49**
Sustainable Business Performance	4.5	.88	.60**	.49**	*.95*

Table 3: Direct and Indirect Effect

Direct Effect	***Estimate***	***S.E***	***P***	***LLCI***	***ULCI***
GI⟶ SBP	***.42***	***.06***	***0.00***	***.30***	***.54***
GI ⟶GOC	***.44***	***.03***	***0.00***	***.38***	***.50***

GOC⟶SBP	***.19***	***.09***	***0.00***	***.01***	***.38***
Indirect Effect	***EFFECT***	***S.E***		***LLCI***	***ULCI***
GI⟶GOC⟶SBP	***.08***	***.03***		***.02***	***.14***

Note: GI= Green Innovation

GOC=Green Organizational Culture

SCP= Sustainable Business Performance

Discussions:

This study explores how green innovation affects sustainable business performance by mediating role of green organizational culture. Using the conceptual framework presented in Figure 1, this research hypothesizes to examine how GI and GOC work together to improve SCP and to explain the role of GI in achieving SBP in manufacturing industries that are trying to remain competitive in the face of changing innovative processes, government legal environmental pressures, and stakeholders demand. The cross-sectional survey in Pakistan validates and supports all of the hypothesized relationships. According to our research, there is a strong correlation between green innovation and sustainable company performance. Despite this, little is known about how green innovation influences the success of sustainable businesses in the original study. Because Zhao and Huang's study from 2022 is solely based on data from manufacturing businesses in China, its conclusions have limited relevance to other regions with differing geographical, economic, and meteorological variables. Green innovation becomes a strategic resource under the RBV framework. By investing in green innovation, businesses can create cutting-edge environmental solutions that meet customers' demands for sustainability and still abide by the law. This enhances brand awareness, expands into new areas, and reduces expenses through efficiency, all of which boost the business's overall performance.

By investigating the function of green organizational culture as a mediator in the connection between green innovation and sustainable business performance, our research closes this gap.

We intend to contribute to the corpus of research on sustainable business practices by better understanding the internal organizational dynamics that result in successful green innovation outcomes by examining this mediating effect. In the previous debate, it was proposed that there would be an increase in sustainable business performance as a result of the relationship between green innovation, green organizational culture, and sustainable business performance. The outcomes of the previous study supported this. According to research, sustainable organizations perform significantly better when they have a green organizational culture (Chandra, 2021; Wang, 2019). Green organizational culture takes on the role of a mediator by fostering an environment that supports the development of green innovation. Businesses with a strong green culture are more likely to have employee participation and support for green initiatives, which helps to guarantee that green innovations are successfully implemented and spread. Because this culture helps to integrate sustainability into the company's core operations, green innovations have a bigger impact on the company's sustainable business performance. A green organizational culture serves as a mediator to strengthen the connection between green innovation and sustainable business performance, according to the RBV hypothesis. In order to ensure long-term, sustainable performance, this culture makes sure that innovation is constantly promoted, enhanced, and integrated into the operations of the company rather than being an isolated undertaking.

Theoretical Implications:

By highlighting green innovation as a vital organizational resource that can give a competitive advantage, the model expands on the RBV. Green innovations improve a company's sustainable business performance by incorporating environmental considerations into its processes, practices, and products. These innovations are distinctive, valuable, and challenging to replicate. This supports the RBV's emphasis on using unique resources to attain higher performance.

Within the RBV paradigm, green organizational culture is positioned as an intangible resource that acts as a mediator in the interaction between sustainable business performance and green innovation. This culture is a valuable, unique, and uncommon resource that enhances the influence of green innovations on sustainability outcomes. It consists of shared values, beliefs,

and practices pertaining to environmental sustainability. According to the approach, maximizing the potential of green innovations requires a green organizational culture.

According to the model, the existence of a green corporate culture is a prerequisite for the influence of green innovation on sustainable business performance. This suggests a resource interdependence in which green innovation and green culture are complementary to one another and produce positive feedback loops. This supports the notion that, in the context of RBV, businesses must build a portfolio of connected resources in order to optimize performance outcomes. The approach suggests that managers should see green organizational culture and green innovation as vital resources that must be supported and coordinated from a strategic management standpoint. To effectively contribute to sustainable business performance, a purposeful approach is needed to include sustainability into the company's innovative processes and core principles.

Practical Implications

Pakistani manufacturing companies should place a high priority on incorporating green innovation into their main business plans. This entails making investments in eco-friendly systems, procedures, and goods that lower emissions, waste, and energy usage. By doing this, businesses can improve their competitiveness in both domestic and international markets in addition to adhering to international environmental regulations.

Manufacturing companies must cultivate a green corporate culture in order to fully benefit from green innovation. This entails encouraging environmental principles and behaviors at every level of the company, from senior leadership to front-line employees. Green efforts should be supported by leadership, who should also train staff members on sustainable practices and urge them to adopt eco-friendly habits. The effective use of green innovations and the augmentation of their influence on sustainable company performance are contingent upon a robust green culture.

According to the approach, Pakistani manufacturing companies should take the initiative to comply with or even surpass environmental laws. Businesses may better negotiate the regulatory environment, avert fines, and enhance their standing with stakeholders—including clients,

investors, and regulatory agencies—by implementing green technologies and fostering a green culture. Additionally, by taking a proactive stance toward compliance, new market opportunities may arise, especially in nations where environmental requirements are a major concern.

Green innovation can save a lot of money by decreasing waste and increasing resource efficiency. In Pakistan, where profit margins might be narrow, green technology adoption can eventually lower operating costs for manufacturing companies. Investing in energy-efficient gear or waste reduction procedures, for instance, can save material and utility costs, improve financial performance, and support sustainability goals.

Limitations And Future Directions

The focus of this model on Pakistan's manufacturing sector is one of its main drawbacks, as it may restrict the applicability of the conclusions to other sectors or geographical areas. The paradigm makes the assumption that green organizational culture has a consistent effect on all firms; yet, cultural diversity within Pakistan's industrial sector may result in differing degrees of acceptance and application of green practices. The perception and adoption of green innovation may be influenced by this cultural variability, which the model may not adequately account for. The approach gives little weight to external factors like supply chain dynamics, market conditions, and governmental regulations in favor of internal elements like company culture and green innovation. The success of green technologies and the creation of a green corporate culture may be strongly impacted by these outside variables. The model may not adequately represent the dynamic nature of green innovation and its long-term effects on sustainable company performance if it is tested with cross-sectional data. Conclusions regarding causality are challenging to draw since temporal circumstances may have an impact on the associations found.

In order to fully understand the long-term impacts of green innovation on sustainable business performance, future research should think about doing longitudinal studies. It may be possible to ascertain whether the model's conclusions are sector-specific or sector-general by broadening the study's focus to encompass other industries in Pakistan, such as services, textiles, or agriculture. This would improve the relevance and application of the model. The model concentrates on sustainable company performance; however, more study may be conducted to examine the precise financial effects of green innovation. To provide a more thorough understanding of the

economics involved, this could involve examining the ways in which green innovation and culture impact market share, profitability, and cost savings. Subsequent studies may integrate external elements into the model, such as international supply chain dynamics, market forces, and regulatory frameworks. Gaining insight into the ways in which these outside factors interact with corporate culture and green innovation could lead to a more comprehensive understanding of the elements influencing sustainable business performance.

Conclusion:

The model that examines how green innovation affects sustainable business performance and how green organizational culture acts as a mediator provides important insights for Pakistan's manufacturing sector. In order to achieve significant sustainability outcomes, it emphasizes how crucial it is to incorporate green innovation into business strategies and foster a green organizational culture. The model emphasizes that green innovation is not only a regulatory compliance measure but rather a strategic asset that may produce competitive advantage and improve overall business performance in the context of Pakistan, where resource restrictions and environmental challenges are common. The results indicate that when accompanied by a strong green organizational culture, green innovations—like eco-friendly technology and procedures—can dramatically increase sustainability metrics. In this process, a green organizational culture is essential because it creates a climate in which sustainability principles are integrated into routine operations and decision-making. The establishment of this cultural basis guarantees the efficient implementation and utilization of green innovations, leading to improved sustainable company performance.

The concept offers Pakistani industrial companies a clear framework for coordinating environmental actions with corporate goals. It implies that in order for enterprises to reap the full rewards of green innovation, they too need to make the investment necessary to foster a culture that values and upholds environmental sustainability. This dual strategy not only puts them in a better position in a market that is becoming more and more focused on sustainability, but it also assists them in navigating the intricacies of environmental rules.

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