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Investigating the Nexus of Green Innovative Capabilities and Organizational Performance: The Influential Role of Green Culture

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Abstract

This research study inspects the effect of green innovative capabilities on organizational performance in Pakistan's pharmaceutical sector, focusing on green marketing and administrative innovations. It evaluates the moderating role of organizational green culture. A survey questionnaire is used to collect data from 385 respondents, particularly supervisory officers/managers, the sample size is calculated using a simple random sampling technique. The pilot study confirms the reliability of the instrument. More Assumptions i.e., normality, validity, and multicollinearity are analyzed. Results show that both green marketing and administrative capabilities significantly boost organizational performance. Green organizational culture positively controls the effect of green administrative innovations but negatively impacts green marketing innovations, revealing challenges in aligning green practices with organizational culture. The research fills gaps in understanding green innovation in developing countries and extends theoretical frameworks with dynamic capabilities and stakeholder theories. Practical insights for pharmaceuticals include leveraging green innovations for better performance and sustainability, Limitations and future recommendations have also been addressed

Keywords: Green Marketing Innovative Capability (GMIC), Green Administrative Innovative Capability (GAIC), Organizational Green Culture (OGC), Organizational Performance (OP)

INTRODUCTION:

Organizations, whether for-profit or not-for-profit, function as structured systems designed to achieve collective goals through established processes, which may focus on financial, non-financial, or social outcomes (Wegner et al., 2022). Achieving superior performance is often associated with Strategic Innovation Capabilities— these discuss an organization's capacity to innovate and discover new operational methods. In competitive environments, such capabilities are vital for developing distinctive, self-reinforcing business models that enable organizations to differentiate themselves (Coe & Yang, 2022; Nagwan, 2021).

Although businesses enhance the standard of living and promote environmental well-being, many continue to cause environmental harm (Bawa et al., 2022; Chen et al., 2018). Traditional economic theories suggest that investing in environmental management may increase transaction costs, potentially negatively impacting economic performance (Ambec & Lanoie, 2008). However, green innovative capabilities have the potential to enhance competitive advantages, improve organizational performance, and increase product differentiation (Hojnik & Ruzzier, 2016; Huang & Li, 2017; Tang et al., 2018). It is noteworthy that in the management literature, the terms innovation and innovative capability are frequently employed synonymously (Forsman, 2011; Hong et al., 2015; Rasiah et al., 2016). Industrialization and economic development in the world have led to increased usage of natural resources and hence negative impact on the environment. Experts have stressed the importance of controlling this environmental degradation through Green Innovative capabilities, these are creation capabilities that entail using safer creation process (Awan et al., 2021; Xie et al., 2019). Acquiring such competencies enhances the positioning of a business, decreases costs and helps in dealing with challenges in the environment making it possible for firms to capitalize growth prospects (Chen et al., 2006; Mittal & Dhar, 2016; Rehman et al., 2021).

Getting organizational culture, which implies having a set of principles and values to be adhered to in an organization, to reflect management decisions is vital for achieving organizational objectives (Al-Swidi et al., 2021; Wang et al., 2021). A Green Organizational Culture (OGC) is an organizational culture that embraces the environment in its mission statement and ensures that every employee would take responsibility for the environment (Abbas & Dogan, 2022). Supervisors also have a critical impact on the management of commitment to conservation schemes, is likely to foster innovative performance and increase of employee sensitivity about the environment (Azhar & Yang, 2022; Cherian et al., 2021). The firms that have advanced green culture are in a better position to tackle environmental issues and implement green practices; therefore they have better performance (Naqshbandi & Jasimuddin, 2022).

Concerns have been raised about the environmental practices of pharmaceutical companies, such as deforestation and toxic emissions, and their impact on consumer health (Chen et al., 2018). The pharmaceutical and related industries are increasingly scrutinized by policymakers, governments, and organizations regarding their environmental and behavioral practices (Chen et al., 2018). The pharmaceutical industry is a significant player in global health, well-being, and the economy, driven by the growing demand from an aging population and improved healthcare systems (EFPIA, 2019). However, there is also increasing recognition of the need for sustainable practices within the industry (Schneider et al., 2010). Pharmaceuticals can pollute the environment, contaminating water sources and ecosystems, with potential long-term health risks to humans (UNEP, 2020). The industry's production processes require considerable raw materials and energy, resulting in substantial waste and pollution (Klatte et al., 2016; López-Toro et al., 2021). In order to reduce their negative effects on the environment, sustainable techniques have been adopted (Chaturvedi et al., 2017).

The Sustainable Development Goals of the United Nations (SDGs) encourage pharmaceutical companies to embrace green innovation by utilizing eco-friendly materials and processes (EFPIA, 2019). Growing scientific evidence of environmental degradation has increased the pressure on organizations to adopt sustainable practices, which contribute to both competitive advantage and sustainable value creation (Awan et al., 2023). Nevertheless, comprehensive evaluations of pharmaceutical companies' performance are still limited, often neglecting industry-specific characteristics and overemphasizing financial performance (Wang et al., 2022).

Green innovative capabilities involve activities that promote balanced economic, social, and environmental development by using modern technology to reduce ecological damage and improve resource utilization (XIAO & XIAO, 2022). This concept has gained importance, particularly in the post-COVID-19 era, underscoring the significance of green innovation and development (XIAO & XIAO, 2022). Addressing these challenges requires interdisciplinary collaboration and effective strategies throughout the pharmaceutical product lifecycle, beginning with drug development (UNEP, 2020). Green innovation impacts both internal and external organizational performance. Internally, it enhances financial and non-monetary outcomes, including environmental performance and the success of new products. Externally, it boosts competitive advantage, social performance, and customer collaboration (Li et al., 2022). While previous studies has often focused on SMEs, there is a need to extend these findings to larger organizations and explore alternative performance metrics (Sahi et al., 2020).

Innovative Capabilities (IC) encompass various dimensions, such as product, process, administrative, and marketing innovations. These combined strategies generally lead to improved outcomes, but further research is necessary to fully understand their impact on business performance (Jamai et al., 2021; Younas & Rehman, 2020). Future research should explore factors influencing green innovation, such as strategic orientation, organizational culture, learning ability, leadership characteristics, market dynamics, and social influences (Li et al., 2022). Fostering effective innovation requires a combination of capabilities, skills, and resources. Managerial

capabilities and organizational culture are key drivers of innovation (Pedraza-Rodríguez et al., 2023). Further investigation is needed to identify specific cultural types that affect a firm's innovation capacity and overall performance (Mendoza-Silva, 2021).

Unique cultural contexts, such as those in the Middle East, present valuable research opportunities to explore the relationship between Strategic Green Innovation Capabilities and Organizational Performance (Nagwan et al., 2021). Moreover, the relatively understudied area of non-technological innovations warrants additional exploration.

This present study is aimed to evaluate the research hypothesis of Elements of Green Innovation in the context of Organizational Performance of Pakistan's Pharmaceutical Industry. Scholars of this research paper explore the effect of green innovation and the mediated effect of green organizational culture on performance. This research paper uses dynamic capability theory and Stakeholder theory to improve theory generalizability. Al though most empirical works focus on dimensions of technical changes, newly emerging lights highlight the call to look at non-technical changes. Standard key performance indicators (KPIs) are unidimensional, and therefore require a multi-dimensional framework of production, finance, markets, and innovation. Many of the key findings of the study focus on how important green innovative capabilities are – especially marketing and administrative ones. Organizational culture plays a significant role in fostering innovation and green capabilities. While most research has been conducted in developed nations, there is a critical need to investigate emerging markets like Pakistan (Soomro et al., 2024). This study integrates multiple theoretical frameworks, including stakeholder theory and dynamic capabilities theory, to offer a thorough comprehension of the determinants and impacts of green innovation. The study seeks to answer the following questions: What is the effect of green innovative capabilities (Marketing and Administrative) on organizational performance? What role does green organizational culture play in various green innovative capabilities and organizational performance?

LITERATURE REVIEW:

Research on organizational performance often treats it as a dependent variable, examining how various factors influence a firm's effectiveness and efficiency. Nagwan et al. (2021) emphasize innovative capabilities' pivotal role in advancing organizational efficiency. In the severe business world of today, fostering these capabilities is essential for achieving effective and efficient performance, as demonstrated in studies on green innovation in Pakistan to remain competitive and deliver value to stakeholders and the broader economy, firms must prioritize innovation (Bigliardi, 2013). Despite its importance, nearly half of the studies on the innovation-performance link rely on financial indicators, with only 24% employing non-financial metrics (Jamai et al., 2021). Financial metrics tend to dominate (Lumpkin & Dess, 1996), but focusing solely on them

can limit a comprehensive understanding of innovation's effectiveness (Hilmi et al., 2011). Measures that are both financial and non-financial can be used to evaluate performance (Chen et al., 2018), green innovative capabilities have the potential to improve both non-financial outcomes like consumer loyalty and corporate reputation as well as financial performance by increasing resource productivity and market share (Oluwajimade & Olanrewaju, 2023).

Chen et al. (2018) suggest that early adopters of green innovation may profit from a "first-mover advantage," which could result in increased product prices and benefits over competitors. Organizational performance is closely linked to market success, with green innovation often resulting in effective products, particularly in fields like medicine, cosmetology, and environmental protection (Fitriasari, 2023). Hansmann et al. (2012) and Strezov et al. (2017) classify performance into three dimensions: economic, social, and environmental. The Triple Bottom Line concept integrates these dimensions, urging businesses to pursue economic prosperity, environmental sustainability, and social equity, summarized in the "three P's": people, planet, and prosperity (Kanwal et al., 2023).

Unlike traditional innovation, which focuses on improving efficiency and productivity, green innovation is driven by environmental regulations and ecological concerns (Bekk et al., 2016). It is a relatively new concept, with much of the research still focused on its theoretical foundations (Hermundsdottir & Aspelund, 2021). While traditional innovation aims to enhance efficiency, productivity, or performance, green innovation specifically addresses environmental challenges (Albort-Morant et al., 2017). The literature distinguishes between technical and administrative innovations, with the former involving product and process improvements and the latter focusing on organizational structures and administrative processes (Bataineh et al., 2023).

Green innovation is crucial for environmental preservation, energy conservation, and resource recycling, reflecting global trends in environmental governance since 2006 (Song et al., 2020). Nonetheless, research on how green innovative capabilities affects organizational performance have yielded mixed results, with some showing positive correlations and others indicating limited or no impact, particularly in developing countries (Al-Ansaari et al., 2015; Cadogan, 2012; Obeidat, 2016). This research aims to explore how proactive green innovation capabilities influence organizational performance across various industries. The global emphasis on environmental sustainability and climate change necessitates that companies integrate

environmental considerations into their strategies and operations. This integration affects key functional areas such as R&D, design, production, and marketing (Dangelico et al., 2016). Reducing the negative effects of industrial activity on the environment and fostering cleaner production need the development of sustainable goods and services. In order to shape product thoughts and designs and guarantee that the market will embrace these environmentally friendly items, marketing is essential (Dangelico & Vocalelli, 2017). It is instrumental in creating a green market by raising consumer awareness of environmental sustainability and the benefits of sustainable products and services.

Despite extensive research on the green marketing mix, studies focusing specifically on green marketing strategy are limited. Demand from customers is a strong incentive for manufacturers to use green innovative practices (Ghisetti et al., 2017). Green marketing can enhance sales and market share by promoting eco-friendly products and practices, strengthening emotional connections with consumers, and improving customer retention (Thampi & Mon, 2023).

Promoting sustainability initiatives also helps build a positive reputation and differentiates brands (Majeed et al., 2022). Green marketing capabilities by attracting and retaining green consumers, enhancing brand reputation, fostering innovation, and ensuring regulatory compliance, contribute to a resilient and competitive organization (Wang et al., 2021). While the number of green consumers is growing, there remains a need for greater awareness of green products, as green marketing strategies positively impact organizational performance (Afonso et al., 2018; Vasileiou et al., 2022). This leads to the proposal that

H1: Green marketing innovative capabilities have positive influence on organizational performance.

Interest in green administration has surged due to growing environmental concerns such as pollution, flooding, and the demand for clean water. This change emphasizes the value of leading a healthy lifestyle and the growing demand for eco-friendly goods and services. In order to balance the advantages to the economy, society, and environment, green administration entails managing corporate operations and converting inputs like raw materials into outputs like goods and services (Nur Utomo & Pratiwi, 2016). The demand for high-quality, safe, and eco-friendly products is on the rise, with a Nielsen (2014) survey showing that 55% of global online customers are prepared to pay more for goods from socially and environmentally responsible companies. The highest

willingness was observed in the Asia-Pacific region (64 percent), followed by Latin America, the Middle East, Africa, North America, and Europe.

A study by Institute (2010) revealed that integrating environmental processes in SMEs across the European Union led to reduced production costs, lower environmental impact, and improved energy efficiency. This research explores factors influencing green administrative capabilities, such as stakeholder expectations, resource allocation, expertise, and product individuality, as well as the impact of green administration on organizational performance, a relatively underexplored area in management literature. Goyal et al. (2013) discovered that management strategies related to the environment, society, and economy can affect performance and have an impact on both financial and non-financial results.

Green administration, which includes systematic approaches to address environmental concerns, enhances competitiveness, overall performance, and company reputation (Chaturvedi et al., 2017; Nidumolu et al., 2013; Pedersen et al., 2018; Varadarajan, 2020). Digital solutions to reduce paper usage can streamline processes, cut costs, and minimize environmental impact, while green procurement policies support sustainable supply chains (Ogutu et al., 2023; Singh et al., 2024). Green administrative innovations improve organizational performance by boosting efficiency, reducing costs, ensuring compliance, driving innovation, and enhancing stakeholder relationships (Jayaraman et al., 2023).

H2: Green administrative capabilities have positive influence on organizational performance.

A green organizational culture resonates with environmentally conscious consumers, improving customer acquisition and retention through authentic sustainability efforts (Park et al., 2022). Companies can leverage their sustainable practices in marketing by using transparent communication to craft compelling brand stories, which fosters innovative green marketing strategies and helps them stand out in a competitive marketplace. This green culture encourages environmentally responsible marketing builds strong emotional connections with customers, leading to increased loyalty and advocacy, which enhances long-term performance (Thampi & Mon, 2023). Consumers often pay a premium for sustainable products, which directly boosts organizational performance. Emphasizing resource efficiency, such as waste reduction and energy conservation, attracts environmentally conscious consumers and enhances operational efficiency, resulting in cost savings. Adhering to environmental regulations and marketing this commitment

boosts brand reputation and helps avoid fines (Amoako et al., 2022). A genuine green culture can also attract investors focused on sustainable investments, providing financial stability for further innovation (Yang & Chai, 2022). A green culture also strengthens relationships with communities and business partners, which can be highlighted in marketing campaigns to showcase dedication to social and environmental goals (Sharma, 2021). Transparently setting and achieving sustainability benchmarks appeals to consumers who value accountability. Overall, an organizational green culture supports the creation of innovative, credible, and effective green marketing strategies, leading to improved customer engagement, market differentiation, operational efficiency, and stakeholder support, thereby enhancing organizational performance (Aggarwal & Agarwala, 2022).

H3: Green organizational culture has affirmative moderation between green marketing innovative capabilities and organizational performance.

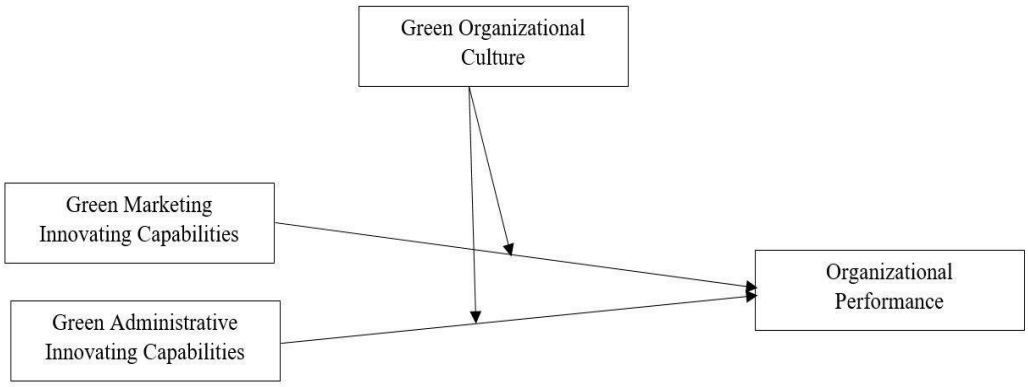
OGC integrates green innovation into the company's vision and goals, enabling efficient execution of green initiatives (Do et al., 2022). This culture fosters green administrative innovations, such as paperless offices and energy-efficient workspaces, which reduce waste, improve efficiency, and lower operational costs. The cost savings from these innovations can be reinvested to further improve performance (Milanesi et al., 2020).

In a green innovation-focused culture, employees are encouraged to suggest greener administrative practices, leading to creative solutions and better overall performance (Al-Swidi et al., 2021). Proactive green innovation help organizations stay ahead of environmental regulations, minimizing the risk of fines and reputational damage while managing environmental impact and strengthening long-term viability (Borsatto & Bazani, 2021).

Green practices also improve relationships with local communities and business partners, fostering greater support and collaboration (Shah & Soomro, 2021). Ongoing enhancements in green administrative practices ensure sustained performance improvements, allowing organizations to grow without depleting resources or harming the environment (Zhang et al., 2023). A green culture that supports administrative innovations leads to improved efficiency, cost savings, employee engagement, compliance, reputation, and stakeholder relationships. These factors collectively enhance organizational performance, demonstrating that green administrative practices are both strategically and operationally advantageous (Shahzad et al., 2023). Therefore, it is theorized that:

H4: Green organizational culture has affirmative moderation between green administrative innovative capabilities and organizational performance.

Fig: 1



Proposed Model

Below given table elaborates how the variables for the present study have been operationalized.

Table 01: Operational Definitions of Variables

Variables	Operational definitions of the variables
Green Innovative Capabilities	Green innovative capabilities refer to a company's ability to develop and implement new and sustainable practices. Green innovation through improvements in processes, product, marketing and administration. Green innovation's objectives are to reduce pollution, save energy, minimize waste, and decrease a firm's negative impact on the environment (Singh et al., 2022)
Green Culture	Green culture is defined as the collective behaviors and shared beliefs of organizational members aimed at environmental conservation (Liu & Lin, 2020)
Organizational Performance	Organizational performance refers to the comprehensive evaluation of an organization's success based on three key dimensions: economic, social, and environmental. This approach goes beyond traditional financial metrics (Dasic, 2023; Elkington & Rowlands, 1999)

RESEARCH METHODOLOGY:

Research design outlines the strategic approach for addressing research questions through empirical data, incorporating elements such as data gathering methods, sample size, sampling strategies, and data analysis. This study focuses on the manufacturing sector, specifically the Pharmaceutical Industry, employing a quantitative, cross-sectional methodology to assess the proposed theoretical model. The research population consists of pharmaceutical companies in Pakistan, registered with the Drug Regulatory Authority of Pakistan. Companies are chosen based on their environmental protection mission as stated on their respective websites. There are total of 969 pharmaceuticals. Given the known population, a simple random sampling technique is used and a sample of 385 is drawn. The unit of analysis is the individual, specifically members of the supervisory team. Pharmaceuticals approached regardless of geographical region. Bhattacherjee (2020) opines that the survey method possesses the following inherent characteristics over other data collection techniques. Firstly, surveys are very valuable for estimating miscellaneous sorts of data that cannot be observed directly, including people's preferences, traits, attitudes, and beliefs. Secondly, the survey method can be used to study large population, which is very difficult to directly observe due to huge number of people, given that the data can be administered through email. Finally, respondents opt for surveys because of their ease. Finally, the survey technique is cheaper, faster, and less demanding in terms of time and effort than the experimental research, case studies, and interviews. This research adopts established scales to assess the observed variables, detail is given in table 02

Table 02: Survey Instruments

Variable	Developed	Used
Green Marketing	(Jun et al., 2019)	(Jun et al., 2019)
Green Administration	(Zhou et al., 2018)	(Zhou et al., 2018)
Green Culture	(Fraj et al., 2011)	(Wang, 2019)
Organizational Performance (Triple bottom line)	(Kaplan & Norton, 2003)(Kaplan & Norton, 2003)	(Tjahjadi et al., 2020)(Tjahjadi et al., 2020)

Green innovative capabilities have been measured by a total of ten items where four items were used for the green marketing while six were for the green administration. The variable of Organizational performance has been measured by ten items. Organizational green culture act as a moderating variable and has been measured using six items. Regarding the measure used, the

instrument employs a 5-point Likert scale in collecting the respondents' responses. To participate 385 individuals, the researcher administered 480 questionnaires to 260 Pharmaceutical all over Pakistan focus on green companies. The second and the larger one had the purpose of guaranteeing the reception of the number of questionnaires properly completed. To avoid common method biasness issue, marketing and administrative innovation capabilities assessed through responses from the marketing and HR departments at the managerial level. WarpPLS version 7.0 is utilized for analyzing direct and moderation effects.

A pilot study was carried out to determine potential issues and evaluate the research instrument's suitability. This study aimed to evaluate the instrument's internal integrity, supporting the development of the questionnaire and methodology. The instrument, adapted from prior research conducted outside Pakistan, required validation for the Pakistani context. The pilot study involved distributing 75 questionnaires to 25 pharmaceutical companies. After explaining the study's objectives and verifying the companies' green practices, the questionnaires were distributed. Out of 75 distributed, 31 were completed in full. To ensure validity, the researcher provided clarifications on green practices as needed. Reliability was tested using SPSS version 27 with Cronbach's alpha, resulting in an overall value of .720. This value, according to Sekaran and Bougie (2016) and Ahmad and Ahmad (2018), falls within the acceptable range of 0.72 to 0.95, indicating the instrument's reliability. Thus, results of pilot study affirmed the questionnaire's dependability for subsequent research.

FINDINGS:

The findings include demographic data summarized through descriptive statistics, alongside assessments of reliability, validity, and hypothesis testing results. The sample comprised 34.0% individuals aged 30-40, with 41.8% having over ten years of experience. All respondents were managerial or supervisory staff from the marketing and administration departments. Among the participating pharmaceutical companies, 34.2% operated internationally while 64.8% operated nationally. Of these, 86.8% were nationally established pharmaceuticals, and 13.2% were international firms operating in Pakistan. The researcher provided explanations about green practices to respondents as needed.

To evaluate data deviation from normality, the study used skewness and kurtosis measures. According to West et al. (1995), skewness values should be less than two and kurtosis values less than seven. Kline (2023) also suggests that skewness values exceeding three and kurtosis values over ten may indicate problems, with values above twenty being extremely problematic. In this study, all item values were within the acceptable limits— less than two for skewness and less than seven for kurtosis, suggesting a properly distributed set of data.

Table 03 Normality Statistics

	CULTURE	GADMIN	GMARKT	PERF
SKEWNESS	0.129	1.273	0.242	0.439
KURTOSIS	-0.634	1.817	-1.073	-1.049

The criterion Fornell-Larcker was utilized in order to evaluate discriminant validity. This criterion requires that the correlation between a construct and any other construct be less than the square root of the average variance extracted (AVE) for that construct (Ab Hamid et al., 2017). The findings validated discriminant validity by demonstrating that the square root of the AVE for each construct was higher than the correlations between that construct and the others.

Table 04: Discriminant Validity (Fronell-Larcker Criterion)

	CULTURE	GADMIN	GMARKT	PERF
GCULTUR	**(0.614)**			
GADMNIC	0.196	**(0.797)**		
GMARKTIC	0.394	0.106	**(0.654)**	
PERFMNC	0.346	0.197	0.424	**(0.664)**

Reliability measures the consistency and stability of an instrument in measuring a construct, thus validating the quality of the measurement (Sekaran & Bougie, 2016). According to Ahmad and Ahmad (2018) and Sekaran and Bougie (2016), a reliability measure typically falls between 0.72 and 0.95, though a value of 0.6 or above can be acceptable for average reliability. The reliability test conducted in this study using WarpPLS 7.0 revealed that the acceptable range was met by the values of each variable's Cronbach's alpha and Composite Reliability, confirming the instrument’s reliability.

Table No. 05: Reliability Statistics

Construct	Cronbach's Alpha	Composite Reliability
CULTURE	0.660	0.779
GADMIN	0.884	0.912
GMARKT	0.652	0.748
PERF	0.738	0.822

The last common concern refers to the collinearity diagnostics that reveal the degree of association between predictor variables when performing the regression analysis that is critical for the accuracy of the outcomes. One of the frequently used diagnostic tests to identify presence of collinearity is the Variance Inflation Factor (VIF). The authors Kroll and Song (2013) found out that a value of VIF exceeding 10 is evidence of severe multicollinearity and Ghani and Ahmad (2010) posit that a value of VIF less than 5 gives an assurance that the problem of multicollinearity is not severe. This method has been used in the present analysis to test for collinearity and from the Table 06 it is evident that there is no problem of collinearity in the analysis.

Table No. 06: *Collinearity Statistics*

CONSTRUCT	CULTURE	GADMIN	GMARKT	PERF
VIF	1.269	1.105	1.367	1.370

As noted by Vinzi (2010), "factor loading shows how well an item represents the underlying construct." Outer loadings are essential for evaluating the extent to which indicators contribute to their respective constructs. In this study, the assessment of outer loadings was conducted using the criteria of .5 and above, as suggested by Hair et al. (2010). However, items with outer loadings between .40 and .70 should only be removed if their elimination improves the Composite Reliability and Average Variance Extracted (AVE). Based on these guidelines, four items belong to organizational performance were removed in this study. All values meet the .50 threshold, confirming that the indicators adequately contribute to the constructs.

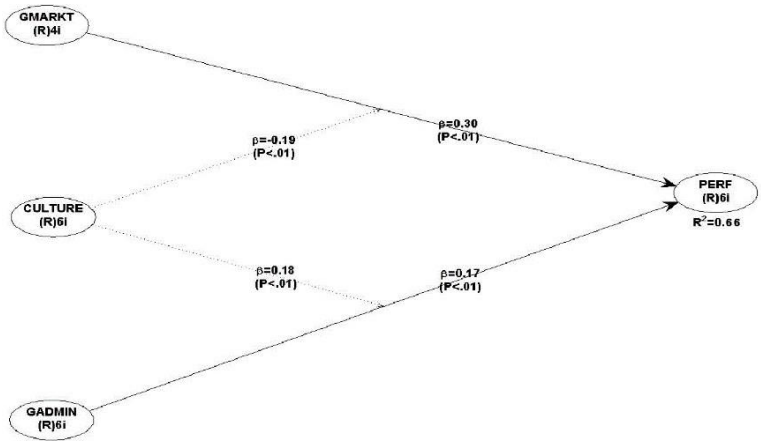


Fig: 02 Model Assessment

The figure depicts the flow of relationship right from the independent variable to the dependent variable with intermediate steps. SEM analysis points to the fact that GMIC has a positive impact on OP; the same way GAIC impacts on OP. The strength or otherwise of these relationships is determined with the help of p-values which are deemed okay if they are equal to or below 0. 05 (Grech & Eldawlatly, 2023). In this study, the p-values for GMIC and GAIC on OP, as well as for Organizational Green Culture (OGC) on GMIC and GAIC, are all below 0.05, indicating significant effects. The p-values for both direct and indirect relationships are acceptable. Additionally, beta values measure the change in the dependent variable resulting from changes in the independent variable, while standardized beta values indicate which independent variable has a stronger effect on the dependent variable (Nieminen, 2022). Table No. 07 provides details on the direct relationships.

Relationship	**Beta (β)**	**p-value**	R^2
GMARKT → PERF	0.30	< 0.01	0.66
GADMIN → PERF	0.17	< 0.01	

Table No.07

Whereas the given table No.08 explains moderation effect in the relationships between independent variables and dependent variable.

Relationship	**Beta (β)**	**p-value**	R^2
GMARKT → CULTURE	-0.19	< 0.01	0.66
GADMIN → CULTURE	0.18	< 0.01	

Table No.08

Table No. 07 summarizes the direct effects (beta values), significance levels (p-values), and the

explained variance (R^2) for Organizational Performance (OP), examining the relationships among Green Marketing Innovative Capability (GMIC), Green Administration Innovative Capability (GAIC), Green Organizational Culture (OGC), and OP. The findings reveal several significant results:

Green Marketing Innovative Capability (GMIC) and Organizational Performance (OP): GMIC has a positive and significant direct effect on OP, with a path coefficient (β) of 0.30 and a p-value less than 0.01. This indicates that improvements in green marketing innovation led to higher organizational performance.

Green Administration Innovative Capability (GAIC) and Organizational Performance (OP): GAIC also positively affects OP, with a path coefficient of 0.17 and a p-value less than 0.01. This suggests that enhanced green administration innovation contributes to better organizational performance.

Green Organizational Culture (OGC) as a Moderator: OGC shows a positive and significant moderating effect with a path coefficient of 0.18 and a p-value less than 0.01. This implies that a favorable green organizational culture strengthens the relationship between green administration innovation and organizational performance.

Interaction between GMIC and OGC: The relationship between GMIC and OGC is negative, with a path coefficient of -0.19 and a p-value less than 0.01. This indicates that increases in GMIC factors are associated with decreases in OGC, suggesting that OGC does not enhance but rather resists the relationship.

The R^2 value, which ranges from 0 to 1, reflects the proportion of variance explained by the model. Values of 0.75, 0.50, and 0.25 are typically considered substantial, moderate, and weak, respectively, though context and discipline can affect these benchmarks; even R^2 values as low as 0.10 may be acceptable in some fields (Purwanto, 2021). The model fit in this study is strong, with an R^2 of 0.66, indicating that 66% of the variance in organizational performance is explained by the independent variables (GMIC and GAIC) and the moderator (OGC). This substantial explanatory power highlights the significant impact of these factors on organizational performance.

DISCUSSION:

In this study, four hypotheses (H1, H2, H3, and H4) were tested to explore the relationships among Green Marketing Innovative Capability (GMIC), Green Administration Innovative Capability (GAIC), Green Organizational Culture (OGC), and Organizational Performance (OP). The analysis confirms H1, showing a positive and significant direct effect of GMIC on OP. This indicates that increasing GMIC enhances OP. This finding aligns with Nidumolu et al. (2013), who stress the importance of integrating environmental considerations into business strategies. Green Marketing plays a crucial role in this integration, as it aids in developing and marketing environmentally sustainable products, which improves organizational performance. The result supports Dangelico and Vocalelli (2017) view of green marketing evolving into a broad organizational strategy and echoes (Ghisetti et al., 2017), who highlight the impact of consumer demand on green innovation. Additionally, Thampi and Mon (2023) and Majeed et al. (2022) discuss how green marketing can build brand reputation and customer loyalty, further supporting the positive impact found in this study. The significant effect observed ($\beta = 0.30$, $p < 0.01$) reinforces the extensive research on the benefits of green marketing capabilities.

H2 is also supported by the findings. The direct effect of GAIC on OP is positive and significant. This suggests that improvements in GAIC contribute to enhanced OP, aligning with previous research by Heras-Saizarbitoria et al. (2011) and the Institute (2010), which indicates that green administrative practices improve performance through reduced costs and increased efficiency.

The study found a negative relationship between GMIC and OGC, leading to the rejection of H3. This result suggests that higher GMIC factors are associated with a decrease in OGC, indicating resistance rather than reinforcement. This finding contrasts with Park et al. (2022) and Sharma (2021), who argue that a strong green culture should enhance green marketing effectiveness. The negative relationship may reflect a misalignment between green marketing initiatives and the broader organizational culture, potentially causing internal resistance.

However, it confirms that culture is always not supportive to change but can also be reluctant to adopt, also it provides justification that green innovative capabilities cannot always driven by green culture thus culture has ability to moderate. As Bataineh et al. (2023) suggests that internal barriers to innovation that hinder companies from embracing change can stem from a shortage of expertise, limited resources, or an inefficient organizational culture. On the other hand,

market-based barriers to innovation may result from intense competitor rivalry or insufficient market demand for new developments.

The results support H4, showing that OGC positively moderates the relationship between GAIC and OP. This indicates that a favorable green culture strengthens the impact of GAIC on OP, aligning with Dangelico and Vocalelli (2017) and Shahzad et al. (2023). Strong green culture helps with more potential favorable effects of green admin innovations which increase organizational performance.

In summary, this research makes useful contributions to the literature by providing an empirical verification of the works done by other authors on the beneficial effects of green administrative capabilities on organizational performance and the review also revealed the challenges involved in synchronizing green marketing innovations with the organization's culture. The study emphasize that green integration should be done systematically to eliminate internal contradictions and enhance sustainability impact; it provides a blueprint to organizations seeking to achieve a true green culture for both administrative and marketing change.

CONCLUSION:

This work provides a valuable contribution on the effects of Green Marketing Innovative Capability (GMIC) and Green Administration Innovative Capability (GAIC) on Organizational Performance (OP) in the context of the pharmaceutical industry of Pakistan. The research shows that GMIC and GAIC significantly improve organizational performance, asserting that greening should be incorporated into marketing and administration. In the same regard, the study also assesses that Green Organizational Culture has a moderating effect on the relationship between GAIC and OP. However, a negative and significant relationship between GMIC and OGC is also noticed and it reflects some rigorous inside the organizational culture.

Significance of the Study:

The purpose of this research is to discover the relationship between Green Innovative Capabilities, organizational performance and culture in reference to the pharma industry of Pakistan. It does so to extend understanding of interchange dynamics between green innovation and performance to enhance the understanding of matter. The research meets the gap in terms of cultural aspect of the context under discussion, which is the Pakistan's pharmaceutical industry, and adds to the literature regarding the green innovation development to achieve organizational success. The paper

uses the theories of stakeholder and dynamic capabilities, theories that are still rare in the green innovation research but encouraged by existing literature. Inclusion of such a study improves the sociopsychological science extant on green innovation particularly in the complicated and developing arenas. There is full compliance when it comes to the United Nations Sustainable Development Goal 13 (Climate Action) as the case shows that there is capability for implementing green innovation that can have positive impact on the world as well as on the organization. Besides, the study is relevant for other industries in the developing economies as it provides for enhancement of sector-wide knowledge and effectiveness. However, this research contribution goes a step further than academizing databases; it also contributes to the enhancement of the theoretical contingency knowledge database on green innovation in complex environments. However, it will be relevant to mention a number of issues in this regard which are concerned with some of the limitations of the study. First, the data collected only from Pharmaceutical Manufacturing Sector in Pakistan so the results may not generalize to industries in other sectors or other parts of Pakistan. Its applicability for the particular sector and the specific country norms which might differ from the South African pharmaceutical industry in some way could have an impact on the results. Second, the study is cross-sectional in nature, meaning that most or all data were gathered at a single time point, although some studies were conducted over multiple time points It is therefore likely that the findings do not reflect the shifting nature of green practices and the impact they may have on organizational performance into the future. Third, the fact that self-collected data from the survey respondents whereby the respondent is likely to give a higher status to their green practices or performance than the actual status to conform to the positive norms in the social setting. Finally, although this study concentrates on the impact of GMIC, GAIC, OGC, and OP, there may still be other factors to consider which have not been investigated in this study like external factors, regulatory changes or competition that may also affects the examined relationships.

Recommendations for Future Research:

It is recommended to proceed from the given findings to similar research studies which take place in other industries and in other geographical areas. The favoring one area over another could be quite enlightening in the identification of specialties and generalization of the green practices. It is also preferred if, in the subsequent researches, the longitudinal research designs would be included

as these assist in determining the further impacts of green interferences; thus, it affords more parameters in terms of the advancement of green practices and the constant results. However, integrating one research method that is questionnaires and quantitative surveys on one hand and interviews and/or case studies on the other could have provided a better insight to understand why, what and how the organizations which are currently involved in the green activities think, bother, act. Inclusion of other external factors as the factors in the 'outside environment' would provide broader picture touching on other forces acting on the green practice efficiency. Speculated research in future should go further to explore the causal explanation of the negative correlation between GMIC and OGC. Awareness of the sources of internal opposition and the chance to respond to them may enhance the approaches to the implementation of green marketing. To this effect, it is critical to note that the current study has the following limitations: For these reasons, there is scope for future research that would provide a clearer picture of the role of the functional performance of green practices and how they affect the organizational performance so that the better and efficient business models can be worked out.

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