JPII 10 (4) (2021) 515-530

Jurnal Pendidikan IPA Indonesia

http://journal.unnes.ac.id/index.php/jpii

GREEN ORGANIZATIONAL CULTURE AND ORGANIZATIONAL PERFORMANCE: THE MEDIATING ROLE OF GREEN INNOVATION AND ENVIRONMENTAL PERFORMANCE

M. Imran*[1], I. Arshad[2], F. Ismail[3]

[1]Faculty of Technology Management & Business, Universiti Tun Hussein Onn, Malaysia
[2]Department of Business Administration, Salim Habib University, Karachi, Pakistan
[3]Faculty of Technology Management and Business, Universiti Tun Hussein Onn, Malaysia

DOI: 10.15294/jpii.v10i4.32386

Accepted: October 3rd 2021. Approved: December 27th 2021. Published: December 31st 2021

ABSTRACT

This study aims to develop and test a theoretical model that empirically examines how green organizational culture affects organizational performance. Additionally, investigated and statistically explored the study model's and their mediating role of environmental performance and green innovation, which had previously received little attention. For the sample size of 170 respondents, a quantitative approach was used. In addition, convenient random sampling was utilized to get data from the respondents. Data was gathered from a field survey utilizing a closed-ended questionnaire from Malaysia's industrial and service organizations from Malacca, Johor, Selangor, and Kedah states. The structural equation modelling approach was used to achieve the research purpose. Green organizational culture was a significant predictor of green performance in this research. Furthermore, the findings reveal that environmental performance and green innovation fully mediate the relationship between green organizational culture and organizational performance. However, this study has several limitations that lead to future research directions. The study's most significant drawback is that the data is collected merely from Malaysian industries, making generalization difficult. In addition, the cross-sectional data adds further restrictions to it. Nevertheless, by addressing organizational performance, which has not been empirically examined, this research adds to the current literature on green organizational culture, environmental performance, and green innovation. Furthermore, this research also presents a novel theoretical explanation for the relationships by understanding the mediating role of environmental performance and green innovation.

Keywords: green organizational culture; environmental performance; green innovation

INTRODUCTION

Organizations increasingly incorporate sustainability into their plans and activities as public awareness and concern about increasing environmental sustainability grow (Ikram et al., 2019; Abid et al., 2021). As decision-makers confront rising public sensitivity, tighter environmental laws, and increasing shareholder pressure to protect the natural environment, performance problems become more relevant to organizations (Wang, 2019). However, today's industrialists, environmental policymakers, corporate executives, and academics concur that environmental deterioration impacts organizational performance (Kraus et al., 2020). Many scholars have investigated the development of managerial skills and attributes that enhance organizational effectiveness, including economic and environmental performance (Dzhengiz & Niesten, 2020). Organizations are increasingly under pressure to develop and execute innovative and long-term solutions both inside their walls and throughout their supply chain networks (Neutzling et al., 2018).

***Correspondence Address**
E-mail: imran29sims@gmail.com

Organizations must focus on environmental and nature conservation activities due to different performance problems that have been identified. In recent decades, industrial practitioners and academics have been motivated by a desire to pay attention to "green" problems (Vallaster et al., 2018). Researchers progressively shift their focus from overall discussion to concepts like green HRM practices (Chakraborty & Biswas, 2020), green supply chain management practices (Tan et al., 2016), green supply chain performance (Cherrafi et al., 2018), green bonding (Li et al., 2018), and green innovation (Zhao et al., 2021). Because of climate changes, business patterns have evolved quickly all over the globe. It is not enough to make a profit and acquire a competitive edge; organizations must also be responsible for the environmental consequences. As a result, the present research focuses on green organizational practices used to assess organizational performance. Green organizational practices are referred to as environmentally friendly acts that contribute to the conservation of the environment and create a sustainable future. Green practices affect how things are done inside firms, hence gaining profit (PerezValls et al., 2016). Thus, green practices must be inextricably linked to critical management and organizational activities (Helfat et al., 2007). These processes should be based on established procedures for identifying and fully using opportunities and adapting to environmental difficulties.

Environmental stewardship is becoming more important inside businesses, and it has become an integral element of their strategy and perspective (Wang & Juo, 2021). According to Li et al. (2018), green initiatives may help organizations achieve better outcomes by lowering manufacturing costs and increasing economic efficiency (Ghisellini et al., 2016). As a result, environmental efforts are often critical to long-term performance (Ainin et al., 2016). While environmental efforts are conceivable, embracing and implementing a green culture may improve organizational performance. There has been little empirical evidence that green innovation and organizational performance provide a competitive advantage to businesses (El-Kassar & Singh 2019). However, green organizational culture has received a lot of attention from researchers, and it is regarded as a significant phenomenon (Yang et al., 2017). Usually, all organizations focus on profit, but times change, and businesses must focus on the environment (Bennett & James 2017).

Researchers have looked at performance through a green organizational culture (Chandra et al., 2021). Furthermore, a few studies have shown that having a green organizational culture improves organizational performance considerably (Wang, 2019). Although various studies have linked green organizational culture to a firm's performance, researchers continue to concentrate on this relationship due to the lack of definitive findings (Muisyo & Qin, 2021). According to the literature, there is no clear link between green organizational culture and organizational performance (Shahzad et al., 2020; Imran & Ismail, 2021). Furthermore, several researchers supported moderators or mediators in the middle of green organizational culture and organizational performance (Gürlek & Tuna 2018; Chandra et al., 2021). As a result, our study adds two mediators between green organizational culture and organizational performance: environmental performance and green innovation. These two mediating variables were already studied in previous research and found to have significant mediating effects (Gelmez, 2020; Zameer et al., 2020). While according to Nishant et al. (2012) and El-Kassar & Singh (2019), little evidence exists within the relationship between green innovation and environmental performance on organizational performance. Furthermore, research has shown that green innovation is critical to attaining long-term performance (Awan et al., 2019; Imran et al., 2021).

In light of the above, this research investigates the link between green organization culture, green innovation, and environmental performance, and it offers valuable management insights into the elements impacting organizational performance. Because there is a gap in the literature, this study investigates the influence of green innovation and environmental performance as a mediating factor in the relationship between green organizational culture and organizational performance (Wang, 2019; Kraus et al., 2020). Given that Malaysia is a developing country, there is a lack of literature examining these relationships (Kraus et al., 2020). The researcher believes that green innovation, green organizational culture, and environmental performance are key factors contributing to a country's economy (Singh et al., 2016; Hadjri et al., 2019; Harris et al., 2021). Green innovation and environmental performance were also evaluated as a mediator between green organizational culture and overall organizational performance in this study, which was conducted in the Malaysian context. In the

next section, a review of the literature and the development of hypotheses are presented. Methodology and hypothesis results are provided in separate sections in the third and fourth sections. Last section results and discussion findings are addressed in light of prior literature, research limitations, implications for managers, and future research directions.

In sustainability, green organizational culture is a relatively undeveloped study topic. As a result, its definition is rather ambiguous. Some researchers Küçükoğlu & Pınar (2016) and Gürlek & Tuna (2018) argued that the concept of green organizational culture might be readily modified and inferred from prior organizational culture literature. The values, beliefs, ethos, and shared mental assumptions that guide members of an organization about the propriety of their actions and behaviour in different circumstances are referred to as organizational culture (Schein, 1992). Green organizational culture may be defined as the values, as well as principles, and beliefs that govern an organization's conduct and activities concerning the natural environment. It expresses an organization's unshakable desire or responsibility to remain dedicated to environmental problems. Pro-environmental culture, sustainability culture, green awareness, and eco-friendly culture are other names for green organizational culture. According to the researcher's organizations, organizational members think and act beyond economic motivations to maximize the beneficial effect of organizational operations while limiting detrimental operational actions on the natural environment; they have a "green" culture (Roscoe et al., 2019). Organizations with a green culture are more likely to evaluate and create different ways to address performance issues. Therefore, performance improvement methods are included in the purpose and vision of such organizations. A strong green culture puts pressure on manufacturers to adhere to business principles and encourages them to do so. As a result, green culture tends to influence organizational members' behaviour by the organization's objectives and ethos (Chang & Lin, 2015).

Choosing a relevant performance metric is getting more difficult, but it is becoming essential among business practitioners and academics. The researchers focused on environmental performance in this study. The researchers were interested in determining the environmental effects of manufacturing companies' activities, mainly when the green organizational culture was implemented. Manufacturers may evaluate their efforts, initiatives, and improvements in the natural environment using a comprehensive performance measure from an environmental standpoint. As defined by Dubey et al. (2015) and Rawashdeh (2018), environmental performance is directly related to the organization's activities and environment. It examines companies' capacity to reduce or eliminate hazardous gas emissions, such as carbon dioxide, resulting from operational activities throughout a supply chain network. While this explanation is correct, it only addresses one of the essential elements of evaluating environmental performance: decreased harmful emissions. As a result, many studies (Chen et al., 2015; Esfahbodi et al., 2016; Feng et al., 2018; Anthony, 2019) have holistically conceived and evaluated environmental performance. These previous studies evaluated an organization's environmental performance based on its ability to reduce waste, reduce carbon dioxide emissions, and reduce energy consumption during production. However, reduce toxic material consumption, conduct frequent environmental audits, and reduce the overall environmental control of working activities.

Different businesses opt to embrace ecological practices due to the global concern for the environment. Unfortunately, in developing nations, this is not the case. Nonetheless, businesses must embrace this strategy since it allows them to protect the environment and decrease pollution (Alhadid & As' ad, 2014; Küçükoğlu & Pinar, 2016; Ifrim et al., 2018). Green innovation may be used for energy-saving product design, processes, and technology, as well as procedures that influence energy efficiency. Consequently, green innovation has evolved into a strategic instrument for attaining the industry's long-term sustainability and improving the Environment (Chang, 2011; Chiou et al., 2011). Since the industrial revolution, environmental damage has been with us, but it has grown much more severe and larger. It is regarded as one of the world's most pressing issues, and although remedial greener policies have been adopted in recent years, preventive efforts are required (Lin et al., 2014; Shahzad et al., 2020).

Organizational performance can evaluate the success of a business's strategic initiatives. Organizational performance, which includes efficiency and effectiveness, according to Szilagyi (1981), is the outcome of organizational actions. The differences between organizational goals and actual outcomes can be explained using organizational performance (Chan et al., 2012). Organizational performance states to financial and non-financial performance as it pertains to the performance of an organization for this research. Firms must make tough decisions if they want to

thrive in today's changing climate and fierce competition. During a downturn in the economy, survival becomes increasingly difficult. According to research, addressing sustainability problems such as adopting a green organizational culture is essential to a business's long-term survival (Cherchem, 2017). According to Venkatraman & Ramanujam (1986) adapted by Wijiabudula & Zehir (2016), organizational performance can be measured in different ways: financial performance, operational performance, and organizational effectiveness. ROI and sales growth and profitability evaluate financial performance; operational performance can be measured by market share, product launches, and market success rates; and organizational effectiveness can be measured by employee satisfaction and business enthusiasm. Because focusing especially on the financial index leads to an overemphasis on an organization's interior performance while neglecting external environmental performance (Úbeda-García et al., 2021). At the same time, Kaplan and Norton (1996) suggested the balanced scorecard process to increase conventional organizational performance measurements (Warahiu, 2014).

Organizational performance offers important environmental impact information, compliance with regulations and organizational systems (Bassey et al., 2013; Wong, 2013; Wijethilake et al., 2018), representing the efficacy and efficiency of the environmental activities of the organization's (Lee 2020). In addition, organizational performance refers to measuring the relationship between the organization and the Environment (Cegarra-Navarro et al., 2016; Trumpp & Guenther, 2017; Mahrous & Genedy, 2019). Prior research has demonstrated that green organizational culture may alter the way organizations think and that employees of the organization are key representatives of amendment in this development (Roscoe et al., 2019). Wang (2019) suggested that organizations can implement a green culture approach if organizational management values are strong and environmental protection concerns are expressed (Chen et al., 2015; Leonidou et al., 2015). Furthermore, a formally green organizational culture based on environmental principles may ease and integrate activities in an organization concerning many environmentally friendly products (Wang, 2019; Qu et al., 2021). Consequently, a green organizational culture may be a valuable tool in assisting organizations in translating their ecologically proactive objectives into organizational performance (Glisson, 2015; Pham et al., 2018).

The managerial challenge is to balance two opposite objectives in facing environmental pressures: choosing an optimal level of performance, although it can cut profits and achieve the lowest possible levels of efficiency to maximize profits (Levinthal & Workiewicz, 2018). When it comes to finances in a green strategy, organizations with a scarcity of a green culture may have to do it with a tiny budget. In that case, top management may allocate these two key organizational significances rather than environmental procedures. These resources, however, are needed to fund environmental action. This causes a manufacturing business to prefer the second goal. In contrast, green organizational culture may be a major driver if organizations with a green culture face pressures from environmental shelters to improve and disclose performance. Therefore, the initial goal for optimum organizational performance may be the greatest option. Previous literature has established that green organizational culture has a positive and significant relationship towards organizational performance (García-Machado & Martínez-Ávila 2019; Chandra et al., 2021); as a result, it is proposed that: H1; Green organizational culture has a significant positive impact on organizational performance.

It's worth discussing if green organizational culture leads to better environmental performance. Only a few pieces of research have been carried out to confirm the link between these two key constructs. Wang (2019) found that green organizational culture strongly predicts environmental performance across 321 Taiwanese manufacturers from various industries. Hadjri et al. (2019) and Hardika et al. (2019) showed that green organizational culture is positively linked to environmental performance in Indonesian research. Manufacturing companies that want to improve their environmental performance should try to create a learning environment inside their "four walls" to quickly adjust to changing environmental factors (Afum et al., 2020). According to several studies (Margaretha & Saragih 2013; Roscoe et al., 2019), manufacturing industries are more likely to establish and adopt a green culture if senior management shows more dedication and importance to environmental issues. As a result, to enhance environmental performance, senior management tends to continuously prioritize and monitor a broad range of environmental policies and take formal action to ensure that all other employees of the organization work toward environmental objectives.

A green organizational culture-based organization, on the other hand, that wants to enhance environmental performance not only emphasizes top management support but also makes a deliberate effort to invest in other organizational workers about environmental projects. Green initiatives are included in mission statements by such organizations to guide organizational workers (Dangelico & Pontrandolfo, 2015) and further build a workforce capable of addressing environmental disputes to attain environmental performance. One of the primary reasons for implementing a green culture approach is to verify that the concept of environmental sustainability is ingrained in the minds of all employees. If businesses embrace a green culture based on a winning strategy that involves all organizational employees, environmental performance is expected to improve. Following the logic of the preceding reasoning, researchers hypothesize that: H2; Green organizational culture has a significant positive impact on environmental performance.

According to Porter et al. (2016), Green organizational culture is defined as the collection of assumptions, beliefs, symbols, and artefacts of an organization that represent a desire or need to function in an ecologically sustainable way. On the other hand, Green culture may be defined as addressing environmental issues as an organizational cultural value (Pham & Tuckova, 2018). Moreover, Green organizational culture is a critical idea that all businesses should embrace to stay productive and competitive for a longer period (Masri & Jaaron, 2017). An organization's "green" culture is described as one in which employees go beyond profit-seeking aims to minimize the negative environmental effect of their work while enhancing the positive impact, according to Roscoe et al. (2019). Organizational green culture includes expectations, qualities, and artefacts representing the organization's requirements and aspirations regarding environmentally sustainable activities (Tahir et al., 2019). To achieve and retain a competitive edge, organizations must establish a green culture and engage in green innovation initiatives. According to Scholz & Voracek (2016), organizations may contribute more to environmental preservation by adopting a green organizational culture.

Furthermore, the environmental actions will assist the organizations in developing and managing their employees' environmental responsiveness and a green culture. Who will improve customer well-being and organizational performance by conserving energy, rationalizing consumption of water usage, as well as reducing destruction of waste and pollution (Pham et al., 2018). As a result, organizations need a strong culture that encourages innovative setups. For example, if their aim is green innovation, green ideas must be communicated across the organization. Green organizational culture ensures the successful implementation of green innovation since it impacts both the organization and its employees (Gürlek & Tuna, 2018). The significance of a green organizational culture as a predecessor of the green innovation was investigated by Küçükoğlu & Pınar, (2016) and Chandra et al. (2021). According to their research findings, green organizational culture has a substantial and beneficial effect on green innovation. Sepahvand et al. (2020) presented that a green organizational culture can enhance the innovative performance of green products in any organization. The researcher noticed that organizational culture could be a key factor in innovation according to previously studied literature. As a result, the following hypothesis is put forth: H3; Green organizational culture has a significant positive impact on green innovation.

Previous research has shown that businesses' constructive and sustained efforts to improve environmental performance increase stakeholder satisfaction, contributing to competitive advantages (Jorge et al., 2015). Forehead & Huynh (2018) claimed that environmental pollution reduction and organizational productivity are well linked, with the results indicating that environmental performance has a favourable impact on organizational efficiency. Furthermore, good environmental performance may lead to various benefits for businesses, such as increased effectiveness in applying input assets, lower manufacturing costs, and a boost in organizational status, which can help businesses grow their market share (Chuang & Huang, 2018). The benefits may enable businesses to increase firm value and improve organizational performance. Forehead & Huynh (2018) has reaffirmed the use of environmentally friendly practices to enhance the performance of environmentally responsible firms to offer them good opportunities and various advantages. Therefore they can improve their organizational performance by lowering pollution, risks and expenses of production and improving the quality of results and business efficiency. In addition, Manrique & Martí-Ballester (2017) suggested that firms with proactive environmental attitudes could achieve greater environmental performance. Several experimental findings in previous literature indicate that environmental performance positively affects organizational performance.

Khanifah et al. (2020) also contended that businesses expect investors to react positively to their reputation as an organization to attract them to invest more capital in the firms, increasing their organizational performance and bringing the investors benefits and enhancing their strong value. However, the firms had better respond favourably to government regulations for environmental pollution than to take an active role in environmentally friendly activities to establish an organizational reputation and improve commercial efficiency. H4; Environmental performance has a significant positive impact on organizational performance.

Green initiatives are only implemented when organizations think that doing so would result in financial gains, operational improvements, and a boost to their competitive edge (El-Kassar & Singh, 2019). Green initiatives would certainly enhance the organization's overall environmental and organizational performance (Weng et al., 2015). Green innovation is divided into two categories: green products and green processes. Green product innovation refers to developing a new product or service with no negative environmental effect other than the existing product (Paul et al., 2014). While, green process innovation enhances current production processes and environmentally friendly technology to create products and deliver services with minimal environmental effect (Tang et al., 2018). The green product's implementation and the process innovation are linked to a successful business strategy and its environmental performance (Chiou et al., 2011). Green supply chain management and organizational performance impact this relationship (Lin et al., 2014). As Zhang & Zhu (2019) stated in their study, green innovation with the product and process innovation decreases energy utilization, pollution releases, trash reprocessing, and green product strategy. In addition, for inside and outside pressures, green products, including process innovation, have been proven to influence competitive improvement through strong environmental culture and values (Li et al., 2018; Wang, 2019). H5; Green innovation has a significant positive impact on organizational performance.

The previous debate on the link between green organizational culture, environmental performance, green innovation, and organizational performance suggested that green organizational culture, environmental performance and green innovation should improve organizational performance. Furthermore, the literature showed that a green organizational culture enhances organizational performance considerably (Wang, 2019; Chandra, 2021). Despite this, Tahir et al. (2019) have shown that green organizational culture has a mixed correlation with organizational performance. The link between green organizational culture and corporate performance is thus deficient and must be more investigated by including a mediator variable. Therefore, environmental performance and green innovation mediate between green organizational culture and organizational performance. Figure 1 depicts a proposed model evaluated in industrial settings to explain the connection between these variables. We thus suggest these hypotheses: H6. Environmental performance has significantly and positively mediated between green organizational culture and organizational performance; H7. Green innovation has significantly and positively mediated between green organizational culture and organizational performance.

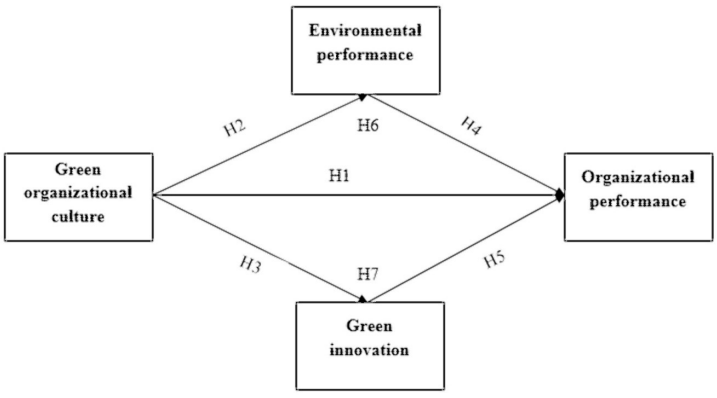

Figure 1. Research Framework

METHODS

For the purpose of this research, data were collected from major Malaysian manufacturing firms using online questionnaires. These manufacturing firms enlisted in the Federation of Malaysia Manufacturer (FMM). According to Foroughi et al. (2019), little attention has been paid towards manufacturing firms that enlisted in the Federation of Malaysian manufacturing directory with regards to green organizational culture, green innovation, environmental performance and organizational performance. Several manufacturing organizations in Malacca, Johor, Selangor, and Kedah, Malaysia. The selection of these states is due to the high concentration of manufacturing firms within these states. The organizations are appeals & clothes, beauty & personal care, chemical, plastic, raw materials, food & drinks, and furniture and furnishing. In Malaysia, these businesses are recognized as technologically advanced and innovative businesses. The present research is a quantitative study of the Malaysian manufacturing industry to evaluate environmental performance and green innovation as mediators in the relationships between green organizational culture and performance. Due to the COVID-19 pandemic, the data for this research was obtained through email. Managers of 550 private limited manufacturing companies in Malaysia received questionnaires through email. Therefore convenience sampling technique was employed for this study. A total of 315 organizations accepted to participate in the study. Increase in the number of COVID-19 cases in these states, 315 questionnaires were emailed to these organizations. Only 170 accurate and complete questionnaires were obtained, which were suitable for further investigation, equivalent to 54%.

Demographic representation was shown in Table 1, as 170 managers and owners from manufacturing industries comprise the Malaysian population.

Table 1. Demographic Profiles

Characteristics	Option	Frequency	Percentage (%)	Total
Gender	Male	130	76	170
	Female	40	24	
Age	25–35	34	20	170
	35–45	40	23	
	45–55	83	49	
	55 – above	13	8	
Marital Status	Single	27	16	170
	Married	143	84	
Education	Diploma	15	9	170
	Bachelor's degree	56	33	
	Master's Degree	91	53	
	PhD	8	5	
Work Experience	1–5 years	12	7	170
	6-10 years	36	21	
	11–15 Years	77	45	
	16 or above Years	45	27	
Position	Owner	48	28	170
	H.R. Manager	31	18	
	Finance Manager	39	23	
	Sales Manager	52	31	
Types of Manufacturing	Food & Beverage	42	25	170
	Apparel & Clothing	37	22	
	Beauty & Personal Care	44	26	
	Furniture & Furnishings	47	27	
States	Malacca	50	29	170
	Johor	62	37	
	Selangor	39	23	
	Kedah	19	11	

The 130 (76%) of responders are male, while the remaining 40 (24%) are female. Also, 83 (49%) respondents fall into the range of 45–55 years, surveyed by 34 (20%) in 25–35 years. While in the range of 35–45 and above 55, 40 (23%) and 12 (8%). Similarly, in marital status, 27 employees were (16%) unmarried, and 143 employees were married (84%). In terms of education, 91 (51%) of the respondents have obtained a master's degree, 56 (33%) a bachelor's degree, and the remaining 15 (9%) diploma and 8 (5%) PhD degree education. Additionally, in terms of job experience, about 77 (45%) of respondents have 11-15 years of experience, while about 45 (27%) have 16 or above years of experience, about 36 (21%) have 6-10 years of experience, and the other 12 (7%) have 1-5 years of experience. Moreover, 52 (31%) respondents are employed as sales managers. In comparison, another 48 (28%) of the respondents are firm owners, and 39 (23%) of respondents are employed as finance managers, while another 31 (18%) are employed as H.R. managers. As mentioned in the table 1, 47 (27%) respondents from Furniture & Furnishings as followed by 44 (26%) Beauty & Personal Care, 42 (25%) Food & Beverage and 37 (22%) were from Apparel & Clothing industries. According to the study, data were collected from various Malaysian states, such as 50 (29%) respondents from Malacca, 62 (37%) Johor, 39 (23%) Selangor and 19 (11%) respondents from Kedah.

The constructs included in this research table 2 are green organizational culture, environmental performance, green innovation, and organizational performance.

Table 2. Variables with Included Items

S. No.	Variable	No. of Items	Source
1	Green organizational culture	6	Fraj et al. (2011) and Wang (2019)
2	Environmental performance	5	Lisi (2015) and Ramanathan (2018)
3	Green innovation	8	Chen et al. (2015)
4	Organizational performance	11	Wu & Wu (2014) and Forehead & Huynh (2018)

All of the variable items of the suggested questionnaire were established on a 5-point Likert scale, 1 "strongly disagree" to 5 "strongly agree". All measurable variables in this study are derived from prior research. For green organizational culture, six items were used in this study. These items were adopted by Fraj et al. (2011) and Wang (2019). The environmental performance was evaluated using a scale established by Lisi (2015) and Ramanathan (2018), which contained five items. Green innovation consists of eight items, including green product and green process innovation four items (Chen et al., 2015). While organizational performance was assessed using an eleven-item measure developed by Wu & Wu (2014) and Huynh (2020).

RESULTS AND DISCUSSION

Partial least squares structural equation modelling (PLS-SEM) was used to investigate the relationship shown in Figure 1. The software used was Smart PLS 3.3.3. Rather than using the conventional covariance-based approach, PLS-SEM was employed in place of that. This is because PLS-SEM needs a large sample size, as required by CB-SEM (Kline, 2012). PLS-SEM is a beneficial technique for assessing a complex, hierarchical model reflecting soft modelling assumptions appropriate and favourable for SEM (Papadopoulos et al., 2017). Complex models are often used for quality assurance in business analytics (Papadopoulos et al., 2017). The validation of the measurement model in figure 2 is the first stage in using the PLS-SEM technique, and the structural model in figure 2 path calculation is the second.

The validity of the measurement model is determined by evaluating the constructs' convergent and discriminant validity and their reliability (Henseler et al., 2015). The structural model is fitted by calculating the path coefficients once the model has been verified. The findings of the measurement model are shown in Tables 3 and Table 4. Cronbach's alpha and composite reliability tests were used to evaluate internal consistency for the purpose of all constructs. The Average Variance Extracted (AVE) method assessed convergent validity. The item loadings were examined to see whether the index was reliable for model measurement. Each measure's loading should be at least 0.70 to ensure that the index's reliability is maintained (Hair et al., 2021).

All of the loads complied with the requirements. Cronbach's alpha and composite reliability were used to evaluate the reliability of all reflective constructs. Most previous research has regarded Cronbach's Alpha and composite reliability as a minimal criterion above or equal to 0.7, with values less than 0.6 being thought to indicate a lack of reliability (Asadi & Dahlan, 2017).

Table 3. Constructs' Reliability and Convergent Validity

Constructs	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Environmental performance	0.833	0.883	0.602
Green innovation	0.926	0.939	0.659
Green organizational culture	0.877	0.908	0.624
Organizational performance	0.858	0.888	0.503

Cronbach's alpha and composite reliability both satisfy the required criteria; therefore, the internal consistency reliability can be deemed acceptable, according to Table 3. Convergent validity was determined using the Average Variance Extracted (AVE) method, which can be accepted if all constructs had AVE values greater than 0.5. (Fornell and Larcker, 1981). Table 3 shows that the Average Variance Extracted (AVE) ranged from 0.503 to 0.659, which met the criteria. To evaluate the research instrument's discriminant validity for this study, the researcher was used both the Fornell-Larcker criteria and Heterotrait – Monotrait (HTMT) ratio. Table 3 demonstrates that the squares roots (correlation with other constructs) of each construct were greater than the sum of squares derived from each construct, supporting the discriminant validity of the survey instrument.

Table 4. Fornell-Larcker Criterion Analysis

Constructs	ENP	GNI	GOC	ORP
ENP	0.776			
GNI	0.676	0.812		
GOC	0.733	0.613	0.790	
ORP	0.758	0.796	0.761	0.709

ENP= Environmental performance; GNI= Green innovation; GOC= Green organizational culture; ORP= Organizational performance.
Note: The highlighted values demonstrate that the AVEs are greater than the correlation, indicating discriminative constructs.

To evaluate the model's validity and multicollinearity, it is important to calculate the Heterotrait–Monotrait (HTMT) ratio. According to Henseler et al. (2015), HTMT is the relationship between trait correlation and the correlation within each trait. Table 5 states that if the HTMT value is projected to rise by more than 0.9, it will lack discriminant validity. From Table 5, it is clear that all constructs have met the threshold value, which means our reflective model has reached the discriminant validity.

Table 5. Heterotrait – Monotrait (HTMT) Ratio

Constructs	ENP	GNI	GOC	ORP
ENP				
GNI	0.761			
GOC	0.853	0.675		
ORP	0.867	0.871	0.837	

ENP= Environmental performance; GNI= Green innovation; GOC= Green organizational culture; ORP= Organizational performance

The PLS-SEM includes the measurement (outer) and structural (inner) models. For example, the measurement model figure 2 encompasses individual item reliability, internal consistency reliability, convergent validity, and discriminant validity.

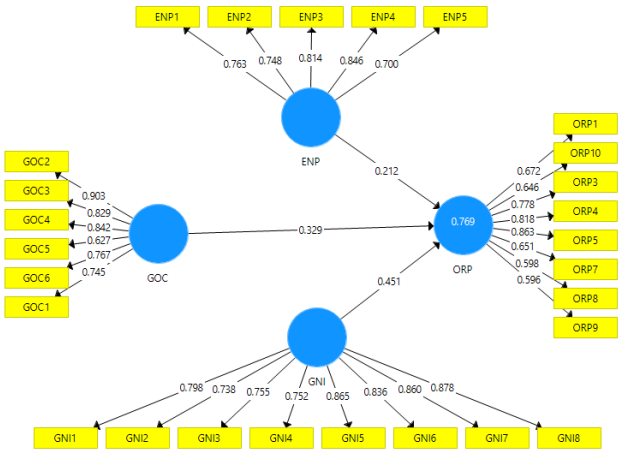

Figure 2. Measurement Model

The researchers compute the p-value and t-value in the structural model to test the given hypotheses. The suggested hypotheses are accepted if the t-value is higher than 1.96, the p-value is less than 0.05. The bootstrapping method's findings are shown in Table 6 below.

Table 6. Hypotheses Results

Hypotheses	Paths	β - value	S. D	T. Values	P. Values	Results
H1	GOC -> ORP	0.642	0.034	18.924	0.000	Supported
H2	GOC -> ENP	0.753	0.026	28.885	0.000	Supported
H3	GOC -> GNI	0.630	0.053	11.842	0.000	Supported
H4	ENP -> ORP	0.385	0.057	6.781	0.000	Supported
H5	GNI -> ORP	0.559	0.053	10.562	0.000	Supported
H6	GOC -> ENP -> ORP	0.290	0.046	6.362	0.000	Mediated
H7	GOC -> GNI -> ORP	0.352	0.049	7.263	0.000	Mediated

Note: GOC, green organizational culture; ORP, organizational performance; ENP, environmental performance; GNI, green innovation.

In light of the predicted relationships in table 6, it is clear that green organizational culture has a significant positive impact on organizational performance (β = 0. 642, t = 18.924, p-value = 0.000), indicating that H1 is supported. Furthermore, the findings show that green organizational culture has a significant positive impact on environmental performance (β = 0. 753, t = 28. 885, p-value = 0.000), supporting H2. Green organizational culture also has a significant positive impact on green innovation (β = 0. 630, t = 11. 842, p-value = 0.000), indicating that H3 is supported. Furthermore, the results H4 is supported (β = 0. 385, t = 6. 781, p-value = 0.000), which states that environmental performance has a significant positive impact on organizational performance. Green innovation has a significant positive impact on organizational performance (β = 0. 559, t = 10. 562, p-value = 0.000), according to the results of H5. Environmental performance and green innovation were modelled in the present research as a mediating variable between green organizational culture and organizational performance. H6 environmental performance mediates the relationship between green organizational culture and organizational performance (β = 0. 290, t = 6. 362, p-value = 0.000), according to the findings.

Furthermore, it was shown that green innovation mediates the relationship between green organizational culture and organizational performance (β = 0. 352, t = 7. 263, p-value = 0.000). As a result, we can safely say that H7 mediates the relationship between green organizational culture and organizational performance.

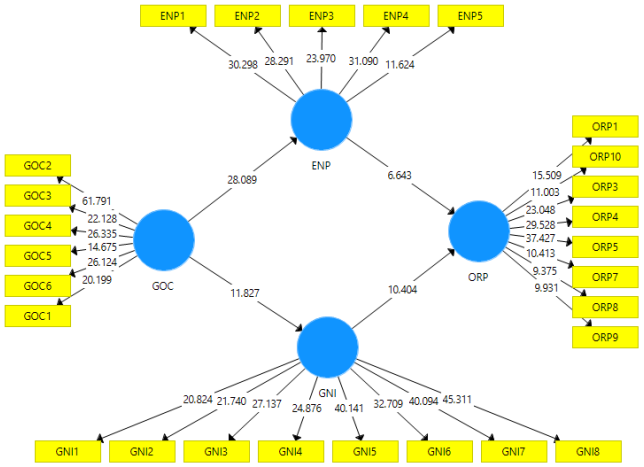

Figure 3. Structural Model

Additionally, this measure contains a structural (inner) model to test research hypotheses. The direct and indirect hypotheses results are shown in Table 6—the structural model as seen in Figure 3. Some researchers provide another approach to calculating the prediction accuracy of the PLS path model to determine the value of Q^2 and R^2 (Hair et al., 2014). The Q^2 is calculated by utilizing the blindfolding method in SmartPLS 3.3.3. A value of Q^2 higher than 0.02, 0.15, and 0.35 shows that small, medium and large predictive relevance in that order, according to Cohen et al. (2013). While, researchers tend to say that applying f^2 to every path coefficient in the structural model yields inaccurate results (Henseler et al., 2012). Cohen (1998) claims that the values of f^2, 0.02, 0.15, and 0.35 are regarded as small, medium, and large effect sizes, and that statement is generally accepted. The value of f^2 indicates if the effect of an exogenous construct on the endogenous one is substantial (Götz et al., 2010).

In other words, R^2 explains the endogenous construct, which consists of all endogenous variables. In this study, R^2 0.767 shows that green organizational culture, green innovation, and environmental performance positively impact an organization's performance. Out of 77% of organizational performance, all exogenous variables can be explained. R^2 can be classified into various categories, such as "weak" (a value between 0.02 and 0.13), "moderate" (a value between 0.13 and 0.26), and "substantial" (a value higher than 0.26). The environmental performance (0.104) and green innovation (0.090) have a smaller predictive relevance effect, while organizational performance (0.376) has a large predictive relevance effect. Since this research model has the predictive ability to explain endogenous constructs, the results of this research were meaningful. Table 7 shows that green organizational culture has a smaller effect (0.074) on organizational performance, a large effect on green innovation, and a large impact on the environment. Green innovation has a medium effect on organizational performance, whereas environmental performance has a large effect.

Table 7. Predictive Relevance and Effect Size

f^2	Innovation	Organizational Performance	Q^2
Green organizational culture		0.074	
Environmental performance		0.452	0.104
Green innovation		0.205	0. 090
Organizational Performance			0.376

Both H6 and H7 green innovation and environmental performance mediate the relationship between green organizational culture and organizational performance. Based on the results, it can be concluded that green organizational culture has a beneficial effect on the performance of manufacturing organizations in Malaysia. As postulated in H1 Wang (2019) and Chandra et al. (2021) reported similar findings, positively affecting performance by introducing a green organizational culture. Also, green organization culture significantly affected environmental performances, i.e. H2. The findings supported Hadjri et al. (2019) and Hardika et al. (2019) studies which emphasized that green organizational culture is positively linked to environmental performance. The relationship of green organization culture on green innovation that is H3 was supported. This finding was similar to Sepahvand et al. (2020); a green organizational culture may enhance green product innovation performance in an organization. The relationship between green organization cultures on environmental performance i.e. was positive and supported; meanwhile, green organizational culture significantly determines that green innovation leads to organizational performance. The organization's environmental performance increases considerably due to these measures. H4, furthermore, environmental performance was found to affect organizational performance significantly. Similar to Forehead & Huynh (2018), the researcher concluded from this study that environmental performance significantly improves the organization's performance. H5 More to the point, the pursuit of green innovation improves organizational effectiveness considerably. The findings support those of El-Kassar & Singh (2019), Ifrim et al. (2018), and Wang et al. (2021), who showed that green innovation could help businesses gain a competitive edge. This result demonstrates that green organizational cultures promote environmentally friendly values, which helps managers become more aware of the resources they use, the waste they make, and the energy they use, increasing organizational performance. While our findings acknowledge that current green environmental regulations and fast-changing technology settings provide significant challenges, they inspire managers to embrace green organizational culture attributes. To make green culture a priority for a business, it should select managers committed to environmental concerns and reflect the shared values of the green culture the business wants to encourage. Under current rigorous environmental regulations and attitudes, managers should exercise eco-friendly behaviour to expand their businesses' market potential and increase their performance. This study indicates that investment in green innovation was helpful to businesses. In other words, the more investment in green innovation, the stronger the organizational performance.

CONCLUSION

This study's conclusions have theoretical as well as practical ramifications. Theoretically, the study is a few in the manufacturing sector, particularly in Malaysia. There is currently no research on the relationships between green organizational culture and organizational performance, with environmental performance and green innovation mediating. In terms of practical application, this study's findings provide significant advice to senior management on environmental performance and green innovation in manufacturing industries. Due to their mediating roles, integrating environmental performance and green innovation could aid senior management in achieving sustainable growth. These findings demonstrate the importance of green organizational culture in nurturing Malaysia's manufacturing industry's environment, innovation, and performance, developing a strong culture characterized by business process stability and reacting to internal and external environments. However, teamwork, transparency, independence, commitment, employee engagement in decision-making, persistence, imagination, accountability, and other characteristics would lead to positive progress increased organizational productivity.

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