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The Impact of Green Innovation on Financial Performance: The Moderating Effect of Green Organisation Culture

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Abstract: Several studies found a direct relationship between Green Innovation (GI) and financial performance in Bahrain. This is an excellent result as it means the incentive within the Bahraini business sector to consider environmental issues in their processes and products is a built-in motivation. After proving this direct impact on financial performance, there was a need to test factors that can enhance this link. This study added to the literature the role of Green organisational culture (GOC) in enhancing the impact of GI on financial performance. The study found a positive moderating impact of GOC on the relationship between GI and Financial performance. When employees share environmental ideals, attitudes, and behaviours, a green culture emerges, promoting environmental awareness. This research highlights real-world examples to illustrate critical ideas for implementing environmental measures in organisations. One way to accomplish this is by creating a more environmentally friendly workplace and educating employees on the relevance of environmental issues. Natural resource preservation should also be a top priority for businesses. It is also possible for businesses to foster employees' intrinsic drive to participate in green activities and keep their GI levels up through internal campaigns to create a green culture.

1. Introduction

In the literature, many moderators were used to check their impact on the relationship between GI and financial performance. Absorptive capacity, managerial concerns, and competitive intensity were used as moderators in the literature. [1,2,3,4]. This research attempts to include green organisational culture (GOC) as another moderator that impacts how GI will enhance financial performance. Achieving this goal will contribute to the literature by introducing another factor that the Bahraini firms should take care of to strengthen the link between GI and financial performance. GOC enhances green performance and firms' competitive advantage [5]. Environmental change has developed into a vital policy issue for many countries since the increase in global warming threatens humanity. Organisations have been blamed for contributing to environmental degradation and pollution through their activities, either directly or indirectly [6]. This has forced industries to start preparing for a carbon-constrained world as governments and scientists are working together to avoid the impact of climatic changes.

GOC is simply a set of values, assumptions, symbols, and organisational artefacts that reflect the desire or obligation to be an environment-friendly firm. Therefore, firms tend to have a set of shared beliefs, values, and assumptions about environmental issues and the management of the environment [7]. These shared beliefs and norms shape the standard behaviours of firms, and they take steps towards implementing green technology to save the world from climate change.

Environmental culture, in all its stages and preparations, is the essence of the cultural process in organisations that seek to protect the environment and nature by acquiring cognitive, emotional, and behavioural components. Through the continuous interaction of individuals with the environment, they will transfer this behaviour to others around them. Through learning processes and systematic and programmed education, a generation can be created with high efficiency

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and willingness to deal expertly and responsibly with environmental issues. The relationship of the concept of culture to the environment expresses several things, including Tepe [5]:

First, the process of awareness of environmental problems is formed through understanding, gained from various institutions, and the most important of which are governmental bodies, organisations, the family, and the school, and this connection between them expresses an important aspect that is an essential entry point for the development of environmental awareness.

Second, culture relates to an essential aspect of personality, which is the behaviour on which the success of awareness and education programs depends for actual conduct, and represents the system of thought, customs, and traditions that reveal fundamental aspects of the human relationship with the environment. Culture may represent an obstacle to the development of environmental awareness.

Third, the concept of culture and environment expresses the idea of transmission and acquisition. Culture, as is well known, describes acquired aspects transmitted through generations, and it is one of the critical development entry points.

The Kingdom of Bahrain has made a great effort to ensure sustainability in the development process in various sectors of its economy. The National Charter, approved by over 98 percent of the citizens, has provisions for environmental protection, the balance of development requirements, and the vision and strategy of Bahrain Economic Vision 2030 [8]. The country has also created various institutions, commissions, and agencies that participate in development programs, policies, and strategies essential to attaining sustainability. This Charter has also enacted various laws linked to sustainable development applications that can be achieved through public awareness and national capacity building.

Also, the Kingdom has implemented various tasks and initiatives suitable for supporting environmental protection and conservation. Some of these initiatives are directed towards energy conservation, such as the green policy, optimal utilisation of resources, and reducing the usage of materials that can negatively impact the environment. The government has also formed a committee to research alternative environment-safe energy. For example, the Kingdom has an electricity and water authority and a National Oil and Gas Authority that help in energy conservation [8]. Based on this, the Kingdom is geared towards protecting the sustainability of water resources and air quality, achieving biodiversity, and protecting the coastal regions from pollution. The country has also designed a waste management system to control waste, such as the national contingency plan containing oil spills, electronics recycling, and hazardous waste management. All these initiatives are geared towards achieving a green culture that will enhance environmental protection and sustainability.

2.　　　Green Culture and Green Innovation

A green organisational culture can be regarded as a tool that creates an atmosphere suitable for creating new ideas that can lead to green innovations within an organisation. This implies that the move in many organisations to promote environmental promotion and sustainability leads to the creation of an organisational culture supported by all firm members [9]. Therefore, this culture allows the organisation to develop initiatives and policies suitable for adopting green innovations to facilitate its environmental conservation strategies.

Besides, GOC can be tied to green organisational performance, which provides essential information about the impact of the environment, compliance with regulations, and organisational systems. How an organisation interacts with its environment describes its green performance [10]. This involves a firm adopting eco-environmental values that facilitate the production of environmentally friendly products. Therefore, green innovation (GI) strategies can be derived from an effective GOC influencing managers' attitudes towards GI. This implies that when the managers are aligned toward preserving the environment, they design policies to protect the environment, thus enhancing the organisational GI [11]. For example, the development of green supply chains management practices such as green purchase and green manufacturing are GI that arises from GOC.

3.　　　The Competitive Advantage of a Firm with GOC

It is evident that GOC impacts the competitive advantage of an organisation. To achieve this, a company must create a positive value surpassing rival competitor. This can be attained when a company is in a position to develop new resources in response to the changing environmental issues [10]. This implies that a company's strong GOC allows its workers to understand its environmental strategy. This can make it easier to include GOC in the organisation's core values, thus in a position to influence environmental preservation values through policies and initiatives of the company. By doing this, the firm enhances its competitive advantage in consumers' minds, which can be attributed to the green orientation of the firm's culture [12]. Therefore, supportive GOC in companies can influence employees' behaviour, thus increasing its competitive advantage.

4. GOC, Green Innovation, and Green Performance

Organisations supporting GI can attain green performance essential in boosting their corporate image and creating new markets. Firms with a GOC that is well designed can effectively influence their GI, which reduces the production of waste and environmental pollution and strengthens the firm's corporate green reputation and image [13]. This, in turn, enhances the organisation's green performance since it will focus more on accomplishing its corporate social responsibility, which is to conserve the environment. The change and Innovation that is realised in the organisation can all be attributed to GOC's influence in creating a shared vision within the organisation, which drives its mission [5]. Organisations are likely to adopt a green innovation strategy if their management share and care for the environment and its sustainability. Therefore, GOC is responsible for strengthening the relationship between GI and green performance.

5. How does GOC Influence GI and Financial Performance

Green workplace practices are essential in conserving natural resources such as energy. Employees of an organisation play a crucial role in their institution's green practices since they reduce energy consumption and other resources in their daily implementation of green behaviours. Employees' green behaviour ranges from minimising energy consumption, reducing water usage, recycling, and participating in environmental programs [13]. These green work practices can lead to adopting green innovation programs within the institution meant to reduce wastage. For example, green manufacturing and packaging can be a consequence of green workplace practices that ends up helping the organisation reduce the consumption of materials and energy during production. This improves the financial performance of the organisation. Therefore, green workplace practices can be attributed to a strong GOC within the institution that leads to the adoption of GI, which helps boost the organisation's financial performance [6]. Green innovations allow organisations to minimise their negative impact on the environment during their operations. It also allows the organisation to use its production resources more efficiently by minimising wastage. On the other hand, organisational culture is essential in making the institution realise its green innovation activities.

If the organisation's culture tends to support its employee's green behaviour, it can increase the employees' emphasis on creating new ideas for environmental conservation. This will allow the organisation to enhance its total value, which can be essential in helping it realise its goals. For example, GOC can lead to the adoption of GI strategies, such as green manufacturing, that can be incorporated and integrated into the total quality management of firms, thus leading to the superior performance of an organisation [12]. Green manufacturing effectively reduces harmful manufacturing since the overall production process produces less waste, thus improving efficiency and performance. This gives an organisation a competitive edge over its competitors since it can produce more quality goods using fewer materials at a relatively low cost [5]. This makes the organisation save more of its resources. Therefore, it is true that organisational green culture helps the company adopt green Innovation that helps reduce production costs and increase the firm reputation and image, which translates to an increase in financial performance.

6. Hypothesis development

Green Innovation may help a firm outperform its competitors. Firms participate in green innovation efforts primarily by increasing the number of transactions that meet the requirements and desires of potential consumers. This can result in increased sales volumes Chen [14], improving the firm's financial situation. Still, other empirical studies show that the relationship between Innovation and profitability is more difficult to establish [14]. According to some experts, Driessen et al. [15]; Zhang [16]; Aguilera and Ortiz [13], green Innovation has a detrimental impact on a firm's financial success. Indeed, they believe that businesses that establish a practice of pursuing environmental objectives will almost certainly experience negative profitability [17]. We propose that a firm's attempts to improve its green Innovation can increase the expenses of its operations, eroding profitability grounds. Aguilera and Ortiz [13] analysed the financial performance of green and non-green innovation enterprises and found that green innovation firms do not outperform non-green innovation firms. According to Liu et al. [18], using green Innovation might result in accumulated costs. Additionally, Driessen et al. [15] noted that Innovation of green products is linked with poor financial success.

Despite this, the majority of experts, Chiou et al. [19]; Cheng et al. [20]; Singh et al. [21], believe that GI has a beneficial effect on financial performance. According to Bonini and Oppenheim [22], green innovation methods contribute to a company's financial success. They think that for businesses to reduce waste, they must implement green innovation processes that result in green-labelled branding that builds a green prestige, which will attract potential consumers and generates revenue. Additionally, Fujii et al. [23] examined Japanese manufacturing enterprises and discovered a favourable correlation between CO2 emission reduction and financial success. Scholars' inconclusive thoughts require additional examination. As a result, the researcher anticipates the following:

H1 Green innovation in Bahraini firms affects financial performance.

O'Regan and Ghobadian [24] stated that a company's culture, strategic planning, and leadership contribute to creativity.

Additionally, they discovered that organisations with a high degree of Innovation had a more defined culture than firms with a low level of Innovation. Accordingly, a well-defined environmental culture and policy may help a firm foster green innovation [25]. A green culture inside an organisation may support and foster environmental technology innovation [26].

A green innovation strategy is formed from an organisation's green culture, which encompasses the firm's conduct and environmental stewardship standards. The green culture of an organisation affects managers' attitudes toward GI [27]. Managers in firms with an environmentally conscious culture are more likely to adopt environmental protection measures, promoting green organisational Innovation. Thus, organisations may distinguish themselves from rivals in terms of green innovation capability by aligning their organisational culture with environmental quality requirements. As a result, implementing a green innovation strategy strengthens a firm's competitive edge and, ultimately, financial success. It is speculated that:

H2: Organisational green culture within Bahraini firms moderates the relationships between green Innovation and financial performance.

7. Methodology:

The current study employs a predominantly deductive survey research methodology. A questionnaire with 17 questions was used to measure GI and GOC. The questionnaire was designed using previously used tools evaluated and verified in the literature.

The survey questionnaire is directed at managers, supervisors, and environmental specialists in Bahraini businesses. Enterprises in Bahrain employ a diverse range of nationalities (Arab, Non-Arab, and Bahrainis). Additionally, because Arabic is the country's native language, the final questionnaire was completed in English and then translated into Arabic. The eight multiple-choice questions are connected to demographic characteristics that reflect the sample's composition and distribution; these variables include Gender, level of education, age, time of service, and the time in present employment, as well as job and financial vs nonfinancial sector status. The range of potential answers on a scale might be rather wide. Respondents used the five-point Likert ordinal scale to indicate their level of agreement or disagreement with each item in the construct in the conceptual model.

8. Study population and sample

The primary population studied to validate the conceptual model was managers, supervisors, or environmental specialists working in (42) listed companies in the Bahrain bourse and five non-listed companies, which were added as they are considered the big polluters because of the type of activities they are doing. A total population of 3,600 was evaluated for this study to obtain 350 replies. The researchers made sure to receive 350 replies, so the response rate was 100%.

9. Assessment of measurement model

convergent validity

As indicated in Table 1, three elements are extracted to verify convergent validity: factor loading (Individual Item reliability), composite reliability, and average variance. According to the commonality test, because all the loading values in the table are more than the threshold value (0.7), this data has no problem. For each construct, the composite reliability indicators were more than 0.70. Additionally, we examined the average variance extracted (AVE) for every construct. The results were much greater than the 0.5 criteria proposed by [28].

Table 1: Measurements Model-Convergent Validity Results

Construct	Items	Loading	CR	AVE
Green Innovation	GI1	0.786	0.812	0.507
	GI2	0.773		
	GI3	0.759		
	GI4	0.722		
	GI5	0.697		
	GI6	0.734		
	GI7	0.698		
	GI8	0.782		
Green organisational culture	GOC1	0.896	0.870	0.528
	GOC2	0.718		

	GOC3	0.758		
	GOC4	0.764		
	GOC5	0.768		
	GOC6	0.739		
Financial Performance	FP1	0.780	0.854	0.662
	FP2	0.865		
	FP3	0.793		

Discriminant validity

Discriminant validity refers to the extent to which items distinguish between constructs or measure different concepts. This is done by looking at the correlations between measures of constructs that might overlap. Cross-loading Variable and Correlation-Root square comparisons using the Fornell-Larcker criteria were undertaken in Tables 2 and 3 to assess this sort of validity. Table 2 demonstrates that the square root of AVE was greater than the inter-scale correlation for each component. Table 3 demonstrates that all variables have a larger value when loaded with the same construct than other variables. This comparison meets Chin's [28] requirements for discriminant validity. In conclusion, these findings demonstrate adequate reliability and convergent validity.

Table 2: Square root of AVE (Latent variable Correlation) according to the Fornell-Larcker criterion

	Financial Performance	Green Innovation	Green Organisational culture
Financial Performance	**0.813**		
Green Innovation	0.432	**0.712**	
Green Organisational culture	0.358	0.424	**0.727**

Note: Bold values indicate higher factorial loads

Table 3: Discriminant Validity- Cross Loading

	Financial Performance	Green Innovation	Green Organisational culture	Green Organisational culture x Green Innovation
FP1	**0.78**	0.3	0.308	0.026
FP2	**0.865**	0.405	0.305	0.062
FP3	**0.793**	0.34	0.26	0.086
GI1	0.339	**0.786**	0.342	-0.205
GI2	0.382	**0.773**	0.306	-0.089
GI3	0.269	**0.659**	0.217	-0.024
GI4	0.343	**0.722**	0.341	-0.172
GI5	0.177	**0.627**	0.205	-0.057
GI6	0.298	**0.734**	0.243	-0.096
GI7	0.313	**0.698**	0.345	-0.147
GI8	0.271	**0.682**	0.381	-0.114
GOC1	0.285	0.366	**0.718**	-0.106
GOC2	0.182	0.293	**0.658**	-0.093
GOC3	0.152	0.225	**0.664**	-0.151
GOC4	0.284	0.303	**0.768**	-0.099
GOC5	0.291	0.255	**0.739**	-0.124
GOC6	0.301	0.378	**0.803**	-0.118
GOC x Green Innovation	0.072	-0.166	-0.154	**1**

Note: Bold values indicate higher factorial loads.

10   Assessment of Structural Model (Inner model)

R -squared

An essential criterion for assessing the structural model in PLS-SEM is the R-squared value, also known as the coefficient of determination [29,30]. The R-squared value represents the variation in the dependent variable(s) that can be explained by one or more predictor variables [31,32].

Although the minimum acceptable level of R^2 varies on the study context, Hair et al. [31] and Falk and Miller [33] advocate an R-squared value of 0.10 as a minimum acceptable threshold.

Moreover, according to Chin [34], the R-squared values of 0.67, 0.33, and 0.19 in PLS-SEM are high, moderate, and weak. For the proposed study model, $R^2 = 0.251$, which is acceptable according to Hair et al. [29], Falk and Miller [33] and a moderate explanatory power according to [34].

Effect Size (F^2)

Effect size indicates the relative effect of a particular exogenous latent variable on endogenous latent variable(s) through changes in the R-squared [34].

It is calculated as the increase in the R-squared of the latent variable to which the path is connected relative to the latent variable's proportion of unexplained variance [34]. Table (4) shows that all the predictors have a small effect size. According to Cohen [35], F2 above 0.35 is considered a large effect size, F2 ranging from 0.15 to 0.35 are medium effect size, F2 between 0.02 to 0.15 considered a small effect size, and values less than 0.02 are considered with NO effect size.

Q- squared

In addition to assessing the size of the R^2 values as a measure of prediction accuracy, researchers should also evaluate Stone- Geisser's Q^2 value. [36,37]. This measure indicates the model's out-of-sample predictive power or predictive relevance. The Q^2 value in the table (4) shows that the Q^2 values are above 0, which means that the model has predictive relevance for the endogenous construct. In the structural model, Q^2 values larger than zero for a specific reflective endogenous latent variable demonstrate the path model's predictive relevance for a particular dependent construct.

Table 4: R-square, F square, and Q square for the Model Predictors.

Predictor(s)	Outcome(s)	R Square	F square	Q square
Green Innovation	Financial Performance	0.251	0.142	0.222
Green Organisational culture			0.057	
Green Organisational culture x Green Innovation			0.036	

11.   Model goodness of Fit (GoF)

GoF is a global fit measure, the geometric mean of the extracted average variances (AVE) and the average R2 of the endogenous variables [38]. Focusing on the model's overall performance, GoF is intended to account for the research model at both levels, namely the measurement and structural models. [28,39].

The calculation formula of GoF is as follows:

$$\text{GoF} = \sqrt{\overline{(R^2)} \times \overline{(AVE)}}$$

The criteria of GoF to determine whether GoF values are no fit, small, medium, or large, to be considered a globally valid PLS model have been given by [40]. Table 5 below presents these criteria:

Table 5: GoF criteria

GoF less than 0.1	No fit
GoF between 0.1 to 0.25	Small
GoF between 0.25 to 0.36	Medium
GoF greater than 0.36	Large

According to table 5 above and the value of the Gof (0.441), it can be concluded that the GoF model of this study is large enough to consider sufficient global PLS model validity.

12.   Hypothesis Testing:

Table 6: Research Hypotheses Path Coefficient

Hypo	Relationship	Std. Beta	Std. Error	T-Value	P-value	Decision
H1	Green Innovation -> Financial performance	0.362	0.053	6.770	0.000	Supported*
H2	Green organisational culture x Green Innovation -> Financial performance	0.136	0.048	2.815	0.005	Supported*

∗   Significant at 0.01 level.

H1 Green innovation in Bahraini firms affects financial performance. The results in the above table show a significant relationship between GI and financial performance in Bahraini firms (β=0.362, p<0.01). This conclusion is similar to

the findings of Lakovou et al [41], who found that 75% of American businesses believed that recognising green process innovations boosted their economic performance. Green process innovations allow companies to employ green raw resources, eliminate waste, minimise carbon emissions, and enhance sustainable practices. The adoption of green process innovation reduces manufacturing costs by using fewer company resources, such as energy usage, which improves the business's financial performance.

H2 Organisational green culture within Bahraini firms moderates the relationships between green Innovation and financial performance. According to the results above, there is a significant moderation impact of GOC on the relationship between GI and financial performance (β=0.136, p<0.01). It can be concluded that when Bahraini firms face environmental pressure, the managers will choose to achieve the optimal level of green performance, even if it reduces profits. Senior management may allocate those funds to more basic organisational concerns instead of environmental rules when firms without a green culture have limited resources to spend on their green strategy. Nonetheless, these resources are required for environmental action. Consequently, a Bahraini company favours the second purpose. In contrast, when enterprises with GOC encounter environmental pressure to produce and publish green performance, GOC is a primary driver of green performance.

Fig. 1: The moderating effect of GOC on GI

Fig (1) shows that the moderating effect of GOC is positive; with higher GOC, the slope is higher, reflecting more impact of GI on Financial performance.

13.   Conclusion

The Kingdom of Bahrain has taken significant steps towards achieving the 17 Sustainable Development Goals (SDGs) set by the United Nations General Assembly, aligning its national development agenda accordingly. Seven of those goals are directly associated with environmental issues. We believe that GOC is stemmed from the General Culture of society. Also, we believe environmental culture is not yet well established in Bahrain. A green Bahraini consumer who puts the environment as part of his priority is not yet found in Bahrain. A consumer ready to sacrifice his interest for the environment's sake can't be seen yet in Bahrain.

Although GOC can be built by organisations, we feel that the general culture within the society impacts it. The study found a direct impact between GI and financial performance within this context. Also found a positive moderating effect of GOC on the relationship between GI and Financial performance. The teams go beyond profit incentives to increase GI performance, influencing the organisation's financial performance. A green culture emerges when employees share environmental ideals, attitudes, and behaviours. This promotes environmental awareness.

Green recruiting, incentives, performance development, and training achieve this. If a company has a green culture, management may encourage workers to learn about environmental issues. They work together to solve environmental challenges and develop green culture. An employee-centred green culture encourages green behaviours that boost GI performance and employee satisfaction. Green culture links green Innovation and performance. If pro-environmental incentive and promotion mechanisms were in place, workers would adopt green beliefs, attitudes, and behaviours to progress their careers. Effective pro-environmental leadership, credibility, peer engagement, and employee

empowerment promote green culture, which drives GI performance and affects financial performance.

Supporting green practices in the workplace is an essential part of organisation management, considering the rising significance of environmentally conscious employee conduct. The organisational culture may be necessary for enhancing workers' eco-friendly work practices. By demonstrating that matching the different components of organisational culture leads to the effective implementation of the GI, this research has substantial practical consequences. In addition, it emphasises the importance of workers' intrinsic motivation in green workplace initiatives. The conservation of energy and natural resources is a significant problem for contemporary organisations. This study gives essential recommendations for adopting environmental measures in businesses by emphasising real examples. This may be achieved through developing a green workplace and increasing staff understanding of the significance of environmental concerns. Companies should also have a solid commitment to the preservation of natural resources. In addition, by conducting internal campaigns to create a green mentality, organisations may nurture the inner motivation of their workers to engage in green activities and maintain GI.

The main limitation of this research is the need to distinguish between the origins of organisational culture and employee attitude culture. In other words, the issue is whether the group or the person is the unit of analysis. Our survey was sent to people. Since GOC was established at the organisational level, individual employee behaviour may diverge from the broader organisational culture, thereby restricting the interpretability of this research. However, management literature demonstrates that organisational culture is a sum of individual employee behaviours. Hence the researcher argues that individual behaviours might serve as proxies for organisational culture. Previous research has repeatedly shown that employee conduct is the optimal method for assessing corporate culture [42,43].

New moderator variables affecting the relationship between GI and financial performance can be tested for future studies, like green social capital, customers' tacit green needs, HR practices, or other economic factors that could also affect firms' Green Innovation.

Conflict of interest

The authors declare that there is no conflict regarding the publication of this paper.

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