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Green Innovation, Corporate Sustainability and Firm Performance: The Mediating Role of Organizational Openness to Change

Rustam Karimov [1,*]

[1] *Department of Business Administration and Organization, Azerbaijan State University of Economics (UNEC), Baku, Azerbaijan*

ABSTRACT

The purpose of this paper is to analyze the impact of green innovation and corporate sustainability on firm performance based on the literature review, and to investigate the mediating role of openness to organizational change with respect to these relationships. The research utilized data from 399 industrial and service enterprises located in the city of Baku to examine whether firms' green innovation and corporate sustainability behaviour results in greater levels of competence and how receptive an organization is to change plays a mediating role between these behaviours and firm performance. The data used in this study were collected during the 2024 calendar year from industrial and service firms operating in Baku, Azerbaijan. Results demonstrate that green innovation, along with corporate sustainability approaches, have a positive effect on firm performance; however, the influence of openness to organizational change as a mediator in these relationships is significantly less pronounced. Regarding the mediation of openness to organizational change, green innovation results in a low level of partial mediation of its effect on performance, while corporate sustainability has a fully mediated effect on performance. Hence, the study represents an added contribution to the literature concerning how sustainability-oriented practices and an openness towards organizational change provide a vehicle for creating value with respect to improving firm performance.

Keywords: Green Innovation, Corporate Sustainability, Openness to Organizational Change, Firm Performance, Business.

* Corresponding author: Department of Business Administration and Organization, Azerbaijan State University of Economics (UNEC), Baku, Azerbaijan
rustamkakarimov.n@gmail.com

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1. INTRODUCTION

Green innovation refers to the combined concepts of environmental sustainability and innovation-driven development and is considered a key factor in ensuring that both economic growth can be achieved while minimizing environmental damage. It is a critical tool for ensuring sustainability, as well as being a major component of a firm's ability to achieve a competitive advantage. As such, green innovation is an indispensable requirement for maintaining corporate legitimacy and supporting innovative practices as part of sustainability. Therefore, businesses that are currently in operation are being encouraged to adopt management practices that include environmental aspects of their operations to encourage innovation and sustainability. At this point, green innovation has developed into a core management strategy, and evidence shows that implementation of these strategies will lead to increased efficiency in using resources and increased success in minimising pollution. Businesses that invest in green innovation create opportunities to expand their business into new markets, thereby creating competitive advantages by positioning themselves as businesses with positive environmental impact. The greater the competitive advantage of a corporation, the greater the likelihood of strategic success. Because of the influence of the global goals for sustainable development, many multinational corporations are actively working to implement the necessary strategies to ensure they practice green innovation as a means to achieve sustainable development goals.

For organizational change to be successful, employees must embrace this change. Openness to change is a prerequisite for this adoption. Therefore, understanding the factors that influence openness to change and the interactions between these factors on openness to change is of great importance. Studies examining the relationship between green innovation and organizational openness to change have revealed a positive effect. Similarly, there are studies that reveal the positive relationship between corporate sustainability and openness to organizational change.

Recent studies show that green innovation and corporate sustainability have become important factors for improving company competitiveness, efficiency, and long-term performance (Fernando et al., 2019). At the same time, the success of sustainable business strategies often depends on how ready organizations and employees are to accept changes and adapt to new ways of working. Although many studies discuss green innovation and sustainability, less attention has been given to the role of organizational openness to change, especially in developing countries such as Azerbaijan.

Based on this gap, this study asks three main questions.

First, how do green innovation and corporate sustainability affect firm performance?

Second, does organizational openness to change explain the link between green innovation and firm performance?

Third, does it also explain the link between corporate sustainability and firm performance? This study uses data from 399 industrial and service firms in Baku, Azerbaijan. The study examines these relationships using this collected data.

The results show that both green innovation and corporate sustainability improve firm performance. However, the role of organizational openness to change is not very strong in all cases. It partly explains the effect of green innovation on performance. At the same time, it fully explains the effect of corporate sustainability on performance. The paper is structured as follows. The next section reviews the literature and theory. The methodology section explains the data, sample, and variables. After that, the results and discussion are presented. The final section concludes the paper and discusses limitations and future research.

2. LITERATURE REVIEW

Huang and Li (2017) conducted a study in Taiwan among manufacturing firms to examine the relationship between green innovation and organizational and social reciprocality. Using survey-based analysis, they demonstrated how improvements in a firm's capacity to produce green innovations yield improved environmental and financial performance outcomes.

Lee and Min (2015) examined manufacturing companies in South Korea using firm-level data. Through an analysis of Green R&D investments, they showed how investing in Green R&D can facilitate eco-innovation and consequently reduce carbon emissions while also enhancing a firm's performance.

Hu et al. (2023) and Liu and Dong (2022) investigated heavily polluting firms in China. Using firm-level data and policy-based analysis, they examined how the green credit policies of the Chinese government affect these firms and found that some firms participate only in symbolic or strategic types of green innovation to meet regulatory demands, while other firms invest in substantive green innovation that produces real technological and process changes.

Lian et al. (2022) also focused on firms operating in China under environmental regulations. Using empirical firm-level analysis, they showed that environmental regulations can force firms into symbolic types of innovation focused mainly on reporting and corporate image, but can also become a driver of substantive innovations that produce real improvements in overall firm performance.

Baah et al. (2021) and Afum et al. (2020) examined firms in Ghana using survey data from manufacturing organizations. Their analyses found that the use of green production and manufacturing processes helps companies meet stakeholder demands while enhancing both financial and environmental performance.

Agyabeng-Mensah et al. (2020) analyzed organizations implementing green logistics management practices. Using empirical analysis of the relationship between green logistics management, marketplace performance, environmental performance, and social performance, they found that companies engaging in sustainable operations benefit not only from direct financial performance improvements but also from improved indirect financial performance.

Hu et al. (2021) and Chen et al. (2023) investigated Chinese firms receiving governmental environmental support. Using firm-level data and policy analysis, they demonstrated that government green subsidies increase the extent to which companies engage in green innovation activities, thereby enabling businesses to engage in sustainable practices while providing stakeholders with the benefits associated with those innovations.

Miroshnychenko et al. (2017) conducted a global study using international firm-level data. Their analysis showed that green practices are generally positively correlated with firm performance, although the strength of this relationship varies by sector, country, and institutional environment.

Fujii et al. (2013) examined the Japanese manufacturing industry using firm-level performance data. Their findings demonstrated that environmental and economic performance can be improved simultaneously.

Chan et al. (2016) investigated firms operating under different levels of environmental dynamism. Using empirical analysis, they found that environmental dynamism strengthens the relationship between green product innovation and performance, suggesting that in sectors with high environmental uncertainty, green innovation becomes a more significant source of competitive advantage.

3. MODEL SPECIFICATION AND DATA

3.1 Model Specification

This study examines the relationship between green innovation, corporate sustainability, organizational openness to change, and firm performance.

Firm performance (FP) is the dependent variable in the model. Green innovation (GI) and corporate sustainability (CS) are treated as the main independent variables. Green innovation includes green product innovation and green process innovation, while corporate sustainability is represented by environmental, economic, and social sustainability. Organizational openness to change (OAC) is considered a mediating variable that may explain how sustainability and innovation initiatives contribute to better firm performance.

Table 1. *Variables Included in the Conceptual Model*

Variable Type	Variable	Symbol
Dependent variable	Firm Performance	FP
Independent variable	Green Innovation	GI
Independent variable	Corporate Sustainability	CS
Mediating variable	Organizational Openness to Change	OAC
Dimension of Green Innovation	Green Product Innovation	GPI
Dimension of Green Innovation	Green Process Innovation	GPrI
Dimension of Corporate Sustainability	Environmental Sustainability	ES
Dimension of Corporate Sustainability	Economic Sustainability	EcS
Dimension of Corporate Sustainability	Social Sustainability	SS

The following hypotheses were developed:

H1: Green innovation positively affects organizational openness to change.

H2: Corporate sustainability positively affects organizational openness to change.

H3: Green innovation positively affects firm performance.

H4: Corporate sustainability positively affects firm performance.

H5: Organizational openness to change positively affects firm performance.

H6: Organizational openness to change mediates the relationship between green innovation and firm performance.

H7: Organizational openness to change mediates the relationship between corporate sustainability and firm performance.

3.2. Data

The study is based on data collected from 399 industrial and service firms operating in Baku, Azerbaijan. Information was gathered through a structured questionnaire distributed to managers and employees. All items were measured using a five-point Likert scale ranging from “strongly disagree” to “strongly agree”.

Table 2. *Description of Variables*

Variable	Symbol	Unit of Measurement	Source	Observation Period	Frequency
Green Innovation	GI	5-point Likert scale	Survey questionnaire	2024	Cross-sectional
Green Product Innovation	GPI	5-point Likert scale	Survey questionnaire	2024	Cross-sectional
Green Process Innovation	GPrI	5-point Likert scale	Survey questionnaire	2024	Cross-sectional
Corporate Sustainability	CS	5-point Likert scale	Survey questionnaire	2024	Cross-sectional
Environmental Sustainability	ES	5-point Likert scale	Survey questionnaire	2024	Cross-sectional
Economic Sustainability	EcS	5-point Likert scale	Survey questionnaire	2024	Cross-sectional
Social Sustainability	SS	5-point Likert scale	Survey questionnaire	2024	Cross-sectional
Organizational Openness to Change	OAC	5-point Likert scale	Survey questionnaire	2024	Cross-sectional
Firm Performance	FP	5-point Likert scale	Survey questionnaire	2024	Cross-sectional

A total of 399 valid responses were retained for analysis. Reliability and validity were assessed before hypothesis testing. Descriptive statistics, correlation analysis, regression analysis, and mediation analysis were used to examine the proposed relationships among the study variables.

4. METHODOLOGY

The research sample consisted of 399 industrial and service firms located in Baku that make up the research sample. Businesses from a variety of industries were included in the study, and the sample was intended to include both the production and service sectors. The generalizability of research findings is strengthened by this diversity. The following industries produced the businesses that took part in the study:

1. The production sector (textiles, machinery, food, chemicals, etc.)
2. Transportation and logistics
3. Wholesale and retail commerce
4. Engineering and construction services
5. Business and financial services
6. Telecommunications and information technology
7. Public services and energy

The study can examine how it impacts both manufacturing and service-oriented businesses thanks to this distribution.

Participating businesses are categorized as follows based on their size:

48% of small businesses

Medium-sized businesses: 34%

Big businesses: 18%

The general perception of Baku's business structure is reflected in this distribution; small and medium-sized businesses are known to predominate in the area. The sample thus reflects a structure that is appropriate for the dynamics of local business.

A structured questionnaire was used to gather research data. Online survey applications and in-person meetings in companies with restricted internet access were the two methods used to collect the data. Participants were informed about the principles of voluntariness during the data collection process, and they were assured that their responses would remain anonymous. These procedures helped improve measurement reliability and decrease respondent bias. A total of 399 valid questionnaires were collected.

The study has three main independent variables: green innovation, corporate sustainability, and organizational openness to change. Firm performance is the dependent variable. Green innovation is examined as green product innovation and green process innovation. Corporate sustainability covers environmental, economic, and social dimensions. All variables were measured with previously validated scales. Responses used a five-point Likert scale from "strongly disagree" to "strongly agree."

To test whether organizational openness to change mediates these effects, regression-based mediation analysis was used. The analysis followed Hayes (2017) and Abu-Bader and Jones (2021). First, the direct effects of green innovation and corporate sustainability on firm performance were tested. Then organizational openness to change was added to the model to check for mediation.

The reliability analysis of the scales and their components related to the variables included in the conceptual model of the study was measured using Cronbach's alpha, and the results are shown in Table 3.

Table 3. *Confidence Levels*

Scales and Components	Number of Statements	Cronbach's Alpha
Green Innovation Scale (GI)	7	0.894
Green Product Innovation	3	0.826
Green Process Innovation	4	0.857
Corporate Sustainability Scale (CS)	17	0.955
Environmental Sustainability	7	0.928
Economic Sustainability	5	0.895
Social Sustainability	5	0.932
Organizational Openness to Change (OAC)	6	0.918
Firm Performance Scale (FP)	10	0.925
Financial Performance	5	0.924
Growth Performance	5	0.879

Table 4. *Exploratory Factor Analysis on Green Innovation Scale*

Expressions	Green Product Innovation	Green Process Innovation
Our company selects the least polluting product materials for product development and design.	0.816	—
Our company selects product materials that consume the least amount of energy and resources for product development and design.	0.781	—
Our company conducts its product development and design activities with the aim of producing products using the least amount of materials.	0.787	—
Our company effectively reduces the emissions of hazardous substances or waste generated during the production process.	—	0.732
Our production process facilitates the recycling and reuse of waste.	—	0.753
Our company reduces the consumption of water, electricity, coal, or oil during the production process.	—	0.795
Our company reduces the use of raw materials during the production process.	—	0.815

Table 5. *Exploratory Factor Analysis on the Firm Performance Scale*

Statements / Expressions	Financial Performance	Growth Performance
Your average net profitability relative to your equity	0,865	—
Your average pre-tax net profitability	0,884	—
Your net income generated by your core business	0,876	—
The financial success of your new product launches	0,688	—
Your overall level of financial success	0,754	—
Average annual sales growth	*It was removed from the analysis.*	*It was removed from the analysis.*
Increase in the number of new products you launch	—	0,711
Increase in your market share compared to your leading competitors	—	0,791
Increase in the number of employees	—	0,754
Increase in the number of new customers	—	0,849
Your overall competitive position in the market	—	0,723
Your overall level of profitability	*It was removed from the analysis.*	*It was removed from the analysis.*

4. EMPIRICAL RESULTS AND DISCUSSION

Before testing the hypotheses, we first looked at the descriptive statistics. This helps to understand the general level and distribution of the main variables in the study: green innovation, corporate sustainability, organizational openness to change, and firm performance in the sample.

Table 6. *Descriptive Statistics*

Variables	Mean	Std. Deviation
Green Innovation	3.87	0.71
Corporate Sustainability	3.79	0.68
Organizational Openness to Change	3.74	0.73
Firm Performance	3.69	0.75

Table 6 shows the basic numbers for the main variables in the study. The results indicate that the average scores for all variables are above the middle point. This suggests that most of the firms report positive perceptions of sustainability practices, openness to change, and how well their company is doing.

Table 7. *Pearson Correlation Analysis*

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Green Innovation (1)	1	—	—	—	—	—	—	—	—	—	—
Green Product Innovation (2)	0,898	1	—	—	—	—	—	—	—	—	—
Green Process Innovation (3)	0,941	0,697	1	—	—	—	—	—	—	—	—
Corporate Sustainability (4)	0,778	0,687	0,741	1	—	—	—	—	—	—	—
Environmental Sustainability (5)	0,807	0,699	0,779	0,915	1	—	—	—	—	—	—
Economic Sustainability (6)	0,675	0,607	0,635	0,897	0,754	1	—	—	—	—	—
Social Sustainability (7)	0,573	0,514	0,539	0,866	0,642	0,700	1	—	—	—	—

Organizational Openness to Change (8)	0,529	0,483	0,492	0,624	0,554	0,553	0,568	1	—	—	—
Firm Performance (9)	0,388	0,393	0,331	0,385	0,336	0,357	0,344	0,242	1	—	—
Financial Performance (10)	0,339	0,363	0,274	0,346	0,304	0,322	0,305	0,216	0,911	1	—
Growth Performance (11)	—	—	—	—	—	—	—	—	—	—	1

Table 8. *Regression Analysis Results of the Effect of Independent Variables on Dependent Variables*

H	Model	N	β	Std. Error	Std. β	p	Result
H1	1	399	0,440	0,035	0,529	0,000	**Supported**
H2	2	399	0,559	0,035	0,624	0,000	**Supported**
H3	3	399	0,370	0,044	0,388	0,000	**Supported**
H4	4	399	0,396	0,048	0,385	0,000	**Supported**
H5	5	399	0,278	0,056	0,242	0,000	**Supported**

Table 9. *Results of the Mediating Effect Analysis*

Independent Variable	Dependent Variable	B	S.E.	Standardized B	t	p	VIF
Constant	FP	1,902	0,199	—	9,560	0.000*	—
GI	FP	0,213	0,070	0,223	3,057	0.002*	2,531
CS	FP	0,218	0,075	0,212	2,902	0.004*	2,531
F-statistic = 39.941; p-Value = 0.000; R = 0.410; R^2 = 0.168; Corrected R^2 = 0.164							

Table 10. *Model 2*

Independent Variable	Dependent Variable	B	S.E.	Standardized B	t	p	VIF
Constant	FP	0,743	0,239	—	8,074	0.000*	—
GI	FP	0,215	0,070	0,224	3,062	0.002*	2,551
CS	FP	0,226	0,082	0,219	2,752	0,006	3,009
OAC	FP	-0,016	0,068	-0,014	-0,234	0,815	1,651
F-statistic = 26.582; p-Value = 0.000; R = 0.410; R^2 = 0.168; Corrected R^2 = 0.162							

The testing of the results above indicates that the initial multiple regression model was statistically significant (F=39.941; p=0.000) in terms of assessing firm performance. In addition, the explanatory power of the model, i.e., the coefficient of determination, indicates that the independent variables of the study accounted for 16.4% of the variance in firm performance. As indicated in the regression analysis, an increase of one unit in green innovation corresponds to an increase in firm performance by 0.223 units (beta=0.223), whereas an increase of one unit in Corporate Sustainability corresponds to an increase in Firm Performance of 0.212 units (beta=0.212). The analysis also shows that there was no multicollinearity amongst the independent variables (VIF values<5). The second multiple regression model also was statistically significant (F=26.582; p=0.000), as indicated by the regression analysis results. As noted above, the results indicated that green innovation has a positive impact on firm performance, while corporate sustainability and organizational openness to change does not. The explanatory power of this second model indicates that the independent variables of the study accounted for 16.2% of the variance in firm performance.

According to research, corporate sustainability initiatives and green innovation both greatly improve business performance. This outcome, which is in line with numerous studies in the literature, shows that environmentally conscious business practices boost a company's competitiveness and operational effectiveness.

Openness to organizational change has distinct dynamics, according to mediation effect analyses. It was discovered that openness had a partial mediating effect on green innovation.

This finding demonstrates that while organizational culture and employees' perspectives on change are significant factors, they are not the only ones that influence how well innovative environmental practices are implemented. However, it has been discovered that corporate sustainability practices are fully mediated by openness to organizational change. This situation shows that for sustainability strategies to improve performance; employees must actively adapt to new procedures.

In this regard, the study's conclusions demonstrate that companies should focus on internal communication, training, and change management initiatives that will help staff members embrace change procedures in addition to investing in environmentally conscious practices.

The results of this study show that both green innovation and corporate sustainability improve firm performance. This supports what previous studies have already found.

However, organizational openness to change works in a more mixed way. It only partly explains the effect of green innovation. At the same time, it fully explains the effect of corporate sustainability.

This suggests that green strategies alone are not enough. Companies also need employees who are ready to accept and adapt to change.

From a practical perspective, managers should not focus only on green technologies and sustainability programs. They also need to pay attention to people and how they respond to change.

Training, clear communication, and strong leadership can help employees adapt more easily.

For policymakers, this suggests that support for green innovation should be accompanied by programs that build internal company capabilities. For example, training programs, education initiatives, and awareness campaigns for firms.

5. CONCLUSION

The results of this study show that both green innovation and corporate sustainability improve firm performance. This is also in line with earlier research.

However, the role of organizational openness to change is not the same in all cases. It only partly explains the effect of green innovation. At the same time, it fully explains the effect of corporate sustainability.

This means that green strategies by themselves are not enough. Companies also need employees who are willing to accept change and adjust to new ways of working.

From a practical point of view, managers should not focus only on green technologies and sustainability programs. They also need to consider how employees react to change.

Simple steps like training, open communication, and supportive leadership can make it easier for employees to adapt.

For policymakers, this means that support for green innovation should go together with programs that build internal company capabilities. For example, training programs, education initiatives, and awareness campaigns for firms.

This study also has practical importance for managers and policymakers. Companies should not only invest in green technologies and sustainable practices, but also create a working environment where employees are open to change and ready to adapt to new processes. Government institutions can also support green innovation by offering financial support, sustainability programs, and other incentives for businesses (Hu et al., 2021; Chen et al., 2023).

At the same time, the study has several limitations. The research was conducted only among companies operating in Baku, so the results may not fully reflect the situation in other regions or countries. In addition, the study used data collected during one period of time, which makes it difficult to examine long-term effects. Another limitation is that the data were based on survey

responses, and some answers may have been subjective. Future studies may include companies from different countries and industries to compare results. Researchers may also examine other factors, such as organizational culture, digital transformation, or leadership style, to better understand how green innovation influences firm performance (Miroshnychenko et al., 2017).

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