CUSTOMER DEMAND FOR ENVIRONMENTAL STANDARDS AND ITS IMPACT ON FIRMS PRODUCT AND PROCESS INNOVATION (CASE OF WESTERN BALKAN COUNTRIES)

Diellza Bilalli
International Balkan University, North Macedonia, diellza.ibu@ibu.edu.mk

Abstract: This study investigates the impact of customer demand for environmental standards on firms' product and process innovation, focusing on the six Western Balkan Countries (North Macedonia, Albania, Kosova, Montenegro, Bosnia and Herzegovina, Montenegro and Serbia). As consumer's awareness of environmental issues increases, their expectations for businesses to adopt sustainable practices are also expected to increase. This also seems to be the case in Western Balkan countries as well. This change in consumer behavior and demand encourages firms to innovate, both in the products they offer and the processes they use to make those products, as they might be pressured by the customers' expectations and demand for firms to be more environmentally friendly. Using data made available from the Business Environment and Enterprise Performance Surveys conducted by the European Bank for Reconstruction and Development and the World Bank analyzing 1881 firms in the Western Balkans in the period between 2018-2020, the study analyzes the relationship between customer demand for environmental standards and innovation activities in Western Balkan firms, by using correlation and regression analysis. Two separate models were tested. As a dependent variable was taken the Customer Demand for Environmental Standards, measured by the percentage of firms that reported that customers required environmental certifications or adherence to certain environmental standards as a condition to do business, while the independent variable in the first model is product innovation, measured as a percentage of firms that reported product innovation, while in the second model, the independent variable was process innovation, measured as a percentage of firms that reported process innovation. On average, 36% of the firms in the Western Balkan Countries reported that they have innovated their products, while 17% of the firms reported that they have innovated their processes. The findings reveal a strong positive correlation between customer demand for sustainability and innovation, indicating that as demand for sustainability increases, the firms' efforts to meet these demands by innovating their products and processes increase too. These findings are also supported by both Ordinary Least Squares models. The results suggest that given 1 percentage point increase in customer demand for environmental standards leads to a 1.53 percentage point increase in the firms engaging in product innovation, and to a 1.31 percentage point increase in firms engaging in process innovation, holding other variables constant. These results show the important role of customer demand for sustainability, driving both product and process innovation, indicating that as environmental concerns grow, businesses are likely to engage in innovation to meet those demands.
Keywords: Environment, standards, innovation, product, process

1. INTRODUCTION

In recent years, with the increasing awareness about the risks and consequences of climate change, a lot of initiatives have been taken and efforts have been made in order to mitigate the effects, on a global level. This has been made possible by countries taking significant measures and enforcing regulations in order to reduce the negative effects of carbon emissions on the environment and society. The increased awareness about the environmental challenges combined with the increased consumer education on climate issues, has resulted in a major change in their purchasing behaviors. Consumers are changing their buying habits, and putting pressure on companies to be more environmentally friendly, by re-evaluating their operations and adopting more sustainable practices.

As environmental awareness continues to grow, it tempts to drive product and process innovation, since businesses try to meet these new demands of their consumers who are more environmentally conscious and prioritize environmentally friendly products. Consumers nowadays, started to think more carefully about the environmental impact of their purchases, influencing their decision-making and increasing their demand for goods that align with their sustainability values. As a result, the companies are not only innovating to comply with government regulations, but are also motivated to innovate to respond to their customer's demands who are more conscious and might even pay more for sustainable products, or products that have been produced in a sustainable manner.

As companies strive to meet this new market demand, many businesses have adopted environmental strategies that focus on reducing their ecological footprint, reducing energy consumption, and minimizing waste (Melville, 2010). These strategies usually lead to innovations that optimize resource use which bring benefits for both the environment and the companies' economic profits.

In countries such as the Western Balkans, where economic development usually takes priority over environmental concerns, the growing consumer demand for sustainable standards is starting to transform businesses. The customers' pressures on companies to meet some environmental criteria are serving as a powerful force driving innovation, pushing firms to improve their products and optimize their processes.

In addition to external pressures, also the companies have started to recognize the long-term financial benefits that sustainable practices bring. Currently, firms that are investing in innovation to meet the demands of the eco-customers, are positioning themselves as leaders in an increasingly sustainability-focused market, therefore strengthening their competitiveness and potential for growth in the long term.

2. LITERATURE REVIEW

The growing demand for environmental standards among customers has become a significant driver of both product and process innovation across industries. As environmental awareness rises globally, customers increasingly expect businesses to adopt sustainable practices and ensure that their products adhere to environmental criteria. This shift in consumer preferences has placed pressure on companies to innovate, not only in the products they offer but also in the processes used to create them, aiming for more environmentally friendly outcomes.

This increasing consumer awareness presents businesses with opportunities to enhance competitiveness and profitability through sustainable innovation (Khachatryan et al., 2023). Research indicates that customer pressure plays a pivotal role in determining green innovation within firms (Lestari et al., 2021). By meeting consumer demand for sustainable products and processes, businesses can secure a competitive advantage (Saxena et al., 2024).

Further, Fuentes et al. (2017) demonstrate a strong link between process innovation and sustainability management, revealing that firms that innovate their processes are more actively engaged in environmental sustainability. As the demand for environmentally friendly goods has surged in recent years, the concept of the "green customer" has emerged—defined as individuals who prioritize purchasing products that minimize negative environmental impact (Guckian, 2017).

Cheng et al. (2023) underscore the significant role of green productivity and process innovation in driving sustainability, emphasizing that environmental awareness is crucial to fostering sustainable practices. However, the relationship between environmental regulation and innovation is complex. Jiang et al. (2021) found that while industry-specific environmental regulations can negatively impact corporate innovation performance, the presence of environmental management system certifications positively moderates this relationship, enhancing corporate innovation outcomes.

In terms of financial performance, Wang and Ahmad (2024) suggest that green innovation has a notable impact across various financial measures. They argue that investment in green product and process innovation not only helps businesses avoid environmental concerns and regulatory penalties but also opens up new market opportunities, promotes a positive green image, and ultimately improves financial performance.

.

3. RESEARCH DATA AND METHODOLOGY

The main purpose of this research is to investigate the relationship between customers' demand for environmental standards with firms' product innovation and process innovation in the Western Balkan Countries, by analyzing the BEEPS Survey data, made available by the joint initiative between the European Bank for Reconstruction and Development, European Investment Bank and the World Bank covering the period 2018-2020 and analyzing 1881 firms in Western Balkan Countries (377 in Albania, 362 in Bosnia and Herzegovina, 271 in Kosova, 150 in Montenegro, 360 in North Macedonia and 361 in Serbia) (EBRD, 2020).

The data are analyzed using correlation analysis and the ordinary least square method. As an independent variable, is customer demand measured as % of firms reporting that their customers require environmental certifications or adherence to certain environmental standards as a condition to do business. The dependent variables are product innovation, measured as % of firms that reported product innovation, and process innovation, measured as % of firms that reported process innovation. As we are testing how the customers' demand for environmentally friendly standards, affects product innovation and process innovation, two separate OLS models are tested.

The following table presents the variables included in this research, including a brief explanation regarding the acronyms, how they are measured, and the source from where they are obtained.

Table 3.1. Variables and Explanation

variable	Acronym	Measured in:	Source
Product Innovation	PI	% of Firms	BEEPS
Process Innovation	PRI	% of Firms	BEEPS
Customer Demand for environmental standards	CDES	% of Firms	BEEPS

Source: BEEPS Survey

The following equations were taken into consideration:

$$\mathbf{PI=\beta_0+\beta_1 CDES}$$

$$\mathbf{PRI=\beta_0+\beta_1 CDES}$$

Where we have:
CDES- representing the dependent variable in both the first and second model, measuring the customer demand for environmental standards (in % of Firms)
PI- representing the independent variable in the first model, measuring product innovation (in % of firms)
PRI- representing the independent variable in the second model, measuring process innovation (in % of firms)
The following Hypotheses were tested:
H0a: Customers' demand for environmental standards has no significant effect on firms' product innovation.
H1a: Customers' demand for environmental standards has a significant effect on firms' product innovation.
H0a: Customers' demand for environmental standards has no significant effect on firms' process innovation.
H1a: Customers' demand for environmental standards has a significant effect on firms' process innovation.

The table below represents the descriptive statistics of the data included in the analysis. The data analyzed are cross-sectional data taken from the BEEPS survey conducted by EBRD, EIB, and WB and collected for the period 2018-2020

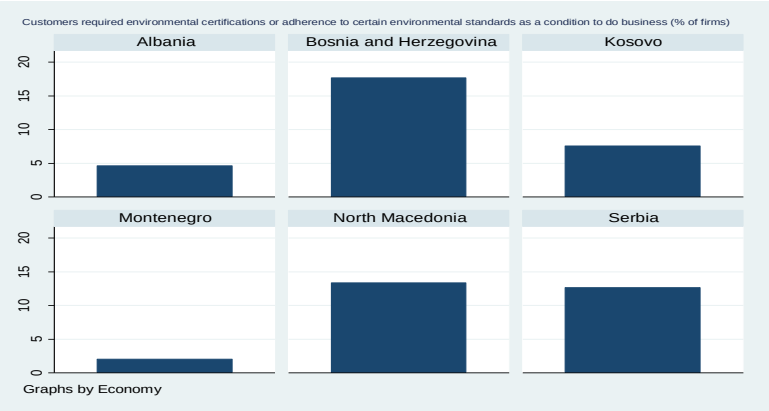
Table 3.2 Descriptive Statistics

Variables	obs	mean	Stand dev	Min value	Max value
PI	6	36.78	11.84848	18.47	48.48
PRI	6	17.02	9.212598	3.65	27.69
CDES	6	9.651667	5.916615	2.04	17.67

Source: Authors calculations based on BEEPS survey

In Western Balkans, on average 9.65% of firms reported that their customers demanded environmental certifications or adherence to certain environmental standards as a condition to do Business. When comparing the western Balkan countries separately, customers in Bosnia are more demanding from firms to meet certain environmental standards, where 17% of the firms reported such demands, in North Macedonia 13%, in Serbia 12%, in Kosovo 7.5%, Albania 4.61% and in Montenegro only 2.04% of firms reported these customers demand.

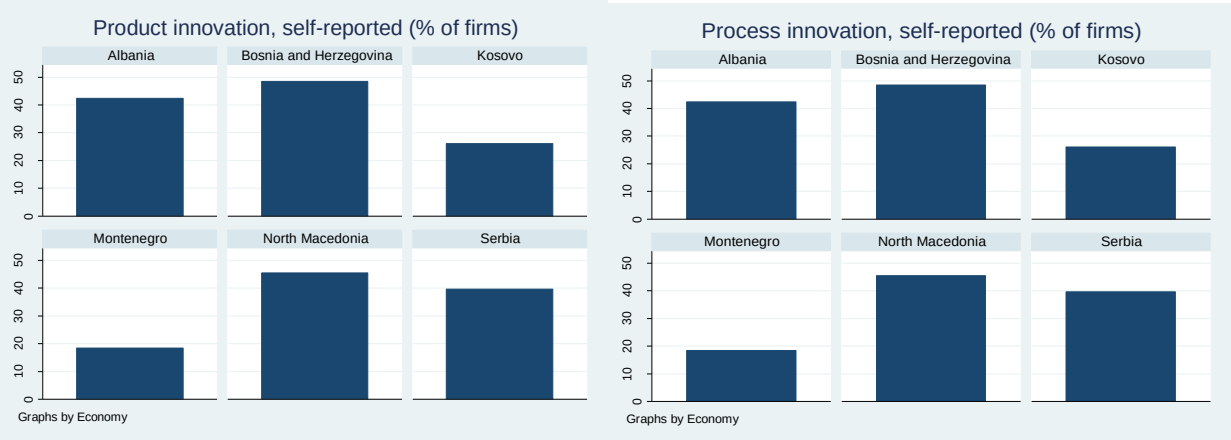
Figure 3.3. Customers require an environmental certificate or adherence to certain environmental standards as a condition to do business (% of firms)



Source: BEEPS survey

To remain competitive and meet demand, as customers' behavior is changing and demanding to protect the environment, on average, 36.78% of firms in the Western Balkans reported that they have innovated their products, having a standard deviation of 11%. The lowest percentage of firms that have reported product innovations are in Montenegro, while in Bosnia and Herzegovina, 48.48% of the firms have reported that they have engaged in product innovation. In North Macedonia, 45% of the firms have indicated that they have innovated their product, in Kosovo 26%, in Albania 42% and in Serbia 39%.

Figure 3.4. Product Innovation, self-reported (% of firms), and Process innovation, self-reported (% of firms)



Source: BEEPS Survey

As firms can contribute to improving the environment in several ways, by introducing more environmentally friendly products, or by improving their processes, to lower their negative impact, on average 17% of the firms in Western Balkans have reported that they have innovated their processes. The highest percentage of firms that have innovated their products (27%) is located in Bosnia and Herzegovina, Serbia 25%, North Macedonia 18.7%, Albania 17%, Kosovo 9% and Montenegro, only 3.65% of the firms have reported that they have innovated their processes.

4. RESULTS AND DISCUSSION

Since this research intends to evaluate if raising concerns of customers for the environment and their increased demand for firms implementing environmental standards, has led the firms to innovate and improve their products or processes, in order to respond to customers' demand, this section reveals the results of the correlation analysis and the results from the OLS models. The results reveal important information about the relationship between the analyzed variables. We initially begin with a correlation analysis to establish the degree to which these variables are related and in what direction.

The following table presents the correlation between Product innovation and Customer demand for firms implementing environmental standards in the Western Balkan Countries. The purpose is to test if the increased demand of customers for environmental standards drives the firms to innovate. The correlation results show a strong positive correlation of 0.7672 between product innovation and customers' demand for environmental standards. This suggests that in Western Balkans, the firms respond to the customer's demands, and as their demand for environmental standards increases, product innovation also tends to increase. Firms are likely to engage in product innovation when customers demand environmentally friendly practices, and customer demand for environmental standards is a significant driver of product innovation, and companies are likely to innovate their products in response to growing environmental demands from customers, highlighting the importance of sustainability in shaping business strategies and innovation efforts.

Table 4.1 Correlation Results between Product Innovation (PI) and Customers Demand for Environmental Standards (CDES)

	PI	CDES
PI	1.0000	
CDES	0.7672	1.0000

Source: Authors calculations based on BEEPS survey

The table below presents the correlation results between Process Innovation (PRI) and Customer demand for Environmental Standards (CDES). According to the results, there exists a very strong positive correlation of 0.8466 between the variables, suggesting that firms are likely innovating and optimizing their processes- such as adopting cleaner technologies, reducing waste, and improving energy efficiency in response to the increasing demand from customers for adherence to environmental standards.

Table 4.2 Correlation Results between Process Innovation (PRI) and Customers Demand for Environmental Standards

	PRI	CDES
PRI	1.0000	
CDES	0.8466	1.0000

Source: Authors calculations based on BEEPS survey

The presented results below show that there is a significant relationship between Customers' Demand for Environmental Standards and firms' product innovation, so if customer demand increases by 1 percentage point, the percentage of firms innovating products would likely increase by 1.53 percentage points, holding other factors constant. The results are significant at a 10% significance level, as indicated by the value of p=0.075 and the value of t=2.39. The overall model is statistically significant, and 58% of the variations in product innovation can be explained by customers demanding environmentally friendly standards. The results indicate that greater customer demand for environmental standards is associated with a significant rise in product innovation efforts by firms.

Table 4.3 Results of OLS model testing the impact of customers' demand for environmental standards on firms' product innovation

Dependent variable PI	***β***	***Standard dev.***	***t***	***P>|t|***
CDES	1.5363	0.6422813	2.39	0.075
Obs	6			
Prob > F	0.0750			
R-squared	0.5885			
Adj R-squared	0.4857			
Root MSE	8.4974			

Source: Authors calculations based on BEEPS survey

When analyzing the relationship between customers' demand for environmental standards and practices and firms' process innovation, the OLS results indicate a positive relationship between the analyzed variables. For every unit

increase in CDES, process innovation increases by 1.31 units, assuming all other factors remain constant. This suggests that as customers' awareness and demand for environmental standards to be employed by firms rises, firms are likely to innovate their processes in order to meet these demands. The results are statistically significant at a 5% significance level, as indicated by the value of p=0.033 and the value of t=3.18. The overall model is significant and approximately 71% of the variance in process innovation can be explained by customer demand for environmental standards.

Table 4.4 Results of OLS model testing the impact of customers' demand for environmental standards on firms' process innovation

Dependent variable PRI	***β***	***Standard dev.***	***t***	***P>|t|***
CDES	1.318275	0.4143142	3.18	0.033
Obs	6			
Prob > F	0.0335			
R-squared	0.7168			
Adj R-squared	0.6460			
Root MSE	5.4814			

Source: Authors calculations based on BEEPS survey

5. CONCLUSIONS

These findings from the analysis suggest that the customer demand for some environmental standards influences and encourages both product and process innovation in Western Balkan countries. The results demonstrate a strong positive correlation between the customer's demand for environmental standards and companies' attempts towards innovations and the introduction of new or more eco-friendly products.

With growing expectations for greener practices among consumers, businesses will increasingly be pressured to introduce sustainable products and improve their production processes, reducing waste and adopting cleaner technologies. That means the consumer demand-innovation relationship is telling us that with increasing consumer sustainability expectations, firms are innovating not only on products but also on the production processes for those products. In the end, as consumer demand continues to grow for sustainable goods, so does the attention of businesses on innovating to provide such products and also on following sustainability lines so they can stay competitive while supporting environmental initiatives, too.

REFERENCES

Cheng, C., Ahmad, S. F., Irshad, M., Alsanie, G., Khan, Y., Ahmad, A. Y. A. B., & Aleemi, A. R. (2023). Impact of green process innovation and productivity on sustainability: The moderating role of environmental awareness. *Sustainability*, *15*(17), 12945. https://doi.org/10.3390/su151712945

European Bank for Reconstruction and Development, European Investment Bank, & World Bank. (2020). *Enterprise surveys 2018–2020: A report on methodology and observations.* https://www.beeps-ebrd.com/wp-content/uploads/2020/04/beeps_vi_es_r_oct20.pdf

Fuentes, J., et al. (2017). Process innovation and environmental sustainability engagement: An application on technological firms. *Journal of Cleaner Production*, *168*, 10–25. https://doi.org/10.1016/j.jclepro.2017.10.067

Guckian, M., Harbo, S., & De Young, R. (2017). Beyond green consumerism: Uncovering the motivations of green citizenship. *Michigan Journal of Sustainability*, *5*, 73–93.

Jiang, Z., Wang, Z., & Lan, X. (2021). How environmental regulations affect corporate innovation? The coupling mechanism of mandatory rules and voluntary management. *Technology in Society*, *65*, 101575. https://doi.org/10.1016/j.techsoc.2021.101575

Khachatryan, A., Sakhbieva, A., Kirpicheva, M., Dolgova, M., & Chernov, S. (2023). Consumer demand for environmental friendliness as a new round of modern marketing development. *Polish Journal of Environmental Studies*, *32*(5), 4095–4111. https://doi.org/10.15244/pjoes/166350

Lestari, T., et al. (2021). The impact of customer pressure and environmental regulation on green innovation performance. *IOP Conference Series: Earth and Environmental Science*, *733*(1), 012048. https://doi.org/10.1088/1755-1315/733/1/012048

Melville, N. (2010). Information systems innovation for environmental sustainability. *MIS Quarterly*, *34*(1), 1–21.

Saxena, P. K., Seetharaman, A., & Shawarikar, G. (2024). Factors that influence sustainable innovation in organizations: A systematic literature review. *Sustainability, 16*(12), 4978. https://doi.org/10.3390/su16124978

Zhao, Y., Wang, Z., & Ahmad, S. (2024). Green process innovation, green product innovation, leverage, and corporate financial performance: Evidence from system GMM. *Heliyon, 10*, e25819. https://doi.org/10.1016/j.heliyon.2024.e25819