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SUSTAINABLE E-COMMERCE AND ENVIRONMENTAL IMPACT ON SUSTAINABILITY

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ABSTRACT. Sustainability is one of the most important socio-economic-environmental topics of the time. Consumers are increasingly demanding companies to have eco-friendly approaches that ensure sustainable e-commerce. There is a great challenge to e-commerce business, taking into account that e-commerce is connected with frequent shipping, high return rates, and non-recyclable packaging, which cause a negative impact on the environment. The studies show that e-commerce is rapidly growing and widely accepted. However, the challenge is how to sustain the growth of e-commerce in the long run considering the environmental impact. Therefore, the research gap on sustainable e-commerce should be considered in the light of the environmental impact. Qualitative, quantitative and cluster analysis methods are applied in this study. The results indicate that investing in more sustainable processes has a positive environmental impact. According to the survey, two out of three customers find online retailers adopting sustainability policies important. Only one out of four customers has decided to refuse firms that do not meet sustainability practices. Therefore, the studies of sustainable e-commerce are crucial. The findings indicate that most European countries have adopted e-commerce sustainability policies while countries in Africa have adopted only few (Kenya). Thus, theoretical and managerial implications are proposed in this study. In addition, all stakeholders should apply policies governing sustainable e-commerce and environmental impact: the government, retailers, and consumers.

JEL Classification: F18, L81, Q56

Keywords: sustainability, environmental impact footprint, e-commerce

Introduction

In the last 3 decades, e-commerce has grown rapidly and is expected to pass the forecasted mark of US$ 2 trillion in sales revenue. Moreover, e-commerce growth can be attributed to the expansion of the coronavirus and government restrictions on direct human interactions. Nevertheless, things will not be as before and will not go back to their previous state. The new normality has adopted technologies for trading, such as e-commerce or online shopping, which involve buying and selling goods and services via computer networks or wireless devices. The growth of e-commerce can be attributed to steady innovation development, advancement in information communication technology and increasing internet use, connected with broad access to it, particularly in Kenya. China seems to be empowered by green manufacturing that ensures the growth of online businesses and shoppers through e-commerce platforms. These two countries work in partnership as Kenya is becoming a business hub for Chinese products. The electronic commerce (e-commerce) market went forward from a basic partner of physical retail to an online shopping environment that includes multiple devices and store models (Svatosova, 2020; Svatosova, 2022). Currently, in countries with developed markets, e-commerce has proper regulations. Therefore, the digital economy is thriving in the competitiveness of the countries and regions, especially Europe and China, compared to Africa (Miethlich et al., 2020). However, Africa's e-commerce landscape is still challenging due to a lack of policies. Therefore, it is essential to enact and implement policies that are in line with businesses and e-commerce sustainability. In Africa, after getting internet access and its penetration in most countries, the benefits of e-commerce are evident in terms of convenience and the variety of high-quality products with low prices. This has been enabled by fierce competition in e-commerce platforms, willing buyers, willing sellers, and seamless online payment in Africa (Che & Xiao, 2020).

A few years ago, there were issues with trust, privacy, and security as major hindrance to e-commerce in Africa. But now it is a thing of the past. With advancement in technology secure e-payment systems have been established in Africa, and e-commerce growth has changed the retail industry. Large numbers of shoppers have turned to online shopping and away from traditional brick-and-mortar shopping. According to the United Nations Conference on Trade and Development's (UNCTAD) e-commerce index report state high e-commerce growth rate in Africa. Particularly in the Nigerian, South African, and Kenyan economies. E-businesses have transformed retail industry in Kenya completely and on the rise to a higher level.

Although online business is spreading consistently in Africa, there is a great challenge to manage this growth in terms of sustainable commerce in Kenya. Kenya has extended online shopping platforms in retail industry to rural communities and small towns, where there is an inadequate e-commerce infrastructure and policies in Kenya. Proving to be the hindrance for full realization and execution of e-commerce operations. Nevertheless, retailers are progressively counting on innovation and technology to drive sales and increase the customer base. The Statista report of 2021 shows that the African retail industry will exceed $30 billion in 2020, from a turnover of $19 billion in 2019.

Jumia is a major online store that uses technological innovation to fuel e-commerce business development in Kenya. The giant online store is an icon with its operations most countries in Africa. The Jumia is a c e-commerce platform that offers online services and

products to its customers in a one-stop shop. Customers select products or services through Jumia's online integrated system platform and pay via e-payment system, such as Mpesa or cash on delivery, while goods are delivered at customers doorstep promptly (Hassan & Lee, 2021).

Previously, cash payment was the most preferred mode of payment in Africa. However, Jumia empowered its customers to pay for their goods using M-PESA in Kenya that agree with other studies in offering smart solutions such as mobile banking digital money. M-PESA is a mobile money solution that offers safe, fast, and low-cost in paying of goods, receive, transfer and store money app support sustainable e-commerce good practices (Popova, 2021). The payment is made once the customer receives the goods. This gives its customers high satisfaction and the company enjoys customer loyalty to the brand store and last mile e-commerce practices for home delivery to reduce pollution (Bjerkan et al., 2020). Thus, if the same practice is excised in Africa the uptake of online businesses in Kenya will boost e-commerce growth, in efficiency and urban sustainability (Taniguchi et al., 2020).

In addition, new start-up companies are mushrooming daily and developing cash flow from fast-evolving economies such as Kenya, despite its slow-growing economy in other sectors, e-commerce is on the rise. This growth is propelled by the increasing number of online buyers and sellers accessing e-commerce platforms due to internet access and penetration, particularly in social commerce and mobile commerce in Kenya.

Furthermore, Kenya has shown that such new models of e-commerce are widely accepted and are supported by reviews and recommendations from close friends. In the field of e-commerce social commerce (S-commerce) and mobile commerce (M-commerce) are widely accepted (Dakduk et al., 2020). Therefore, every brand has a social page for their customers to give feedback.

However, policies on sustainability are lacking. Thus, the enactment and implementation of this policy is the backbone and guarantee of the continuity of this trade. This is because a lack of such regulatory framework policies hinders growth and sustainable e-commerce (Yang et al., 2020). China has sustainable e-commerce policies and Kenya is keen to implement the same. That is forecast to expand e-commerce volume trade between the two countries. E-commerce in Kenya would do much better with good policies enacted to facilitate sustainability.

The communication authority of Kenya (CAK) report show that the electronic commerce (e-commerce) market has grown 27 times after the World Health Organization declared the coronavirus as a pandemic. In the environment of e-commerce businesses have evolved drastically throughout the year regarding product variety, innovation, and technology infrastructure, and e-services provision. Web-based business models, ranging from consumer to consumer (C2C), business to consumer (B2C), and business to business to business to customer (B2B2C), have grown steadily (Huang et al., 2021).

The B2C model has generated revenue of $21.61 billion in the last year alone, not forgetting that 2021 was impacted by Covid-19, and therefore statistics show that the e-commerce market will double if not triple (R, De', Pandey et al., 2020). E-commerce platform has dealt with such as trust, privacy, and security and guarantee business continuity (Kitukutha & Widyatama, 2020). The internet penetration and cheaper mobile phones has offered solutions to the previous challenges in the retail industry.

However, there is a great challenge in managing such e-commerce growth in Kenya, due to the lack of sustainability policies in e-commerce in the following areas: sustainability in packaging, transparency, production process, shipping, and logistics, therefore the research gap in this study. Several questions have been raised to answer the aims and objectives of this study, as follows.

1. Why is sustainable e-commerce and go green important?
2. How to ensure the right policies sustainable e-commerce?

3. What do consumers pay attention to while shopping online?

4. Who are the beneficiaries of sustainable e-commerce?

Therefore, hypotheses have been developed to investigate positive and significant impacts on sustainable e-commerce and environmental impacts.

1. 3Rs packaging material has a positive impact on the environmental footprint.

2. Better policies on sustainability have a positive impact one-commerce growth.

3. Clear communication on statements in e-commerce have a positive impact on online business growth.

4. All stakeholders practicing sustainable e-commerce has a positive impact long term growth.

1. Literature review

1.1. Why is sustainable e-commerce important?

Sustainability is the ability to achieve or meet current needs without compromising the ability to meet future generations' needs and the attempt to reduce negative impacts on the environmental, social, and economic dimensions in terms of efficient utilization of resources (Hajdukiewicz & Pera, 2023) in both domestic and international contexts (Zysk, 2020). More and more companies operate on the basis of the sustainable business models (Stanek-Kowalczyk, 2021). Sustainable e-commerce means coming up with methods that have no negative environmental impact. For example, by using eco-friendly shipping methods that will reduce carbon dioxide (CO_2) emissions that cause pollution. Producing eco-friendly products that are more durable and of high quality. Company social engagement by creating awareness to customers on the benefits of going green and associating themselves with retailers who advocate for green products. Also by implementing policies on transparent green manufacturing and shipping processes (Kiba-Janiak et al., 2021, Ocwa et al., 2021). Similarly, clear communication by companies that will only partner with firms that implement sustainable practices in e-commerce. Sustainable e-commerce can be realized when there is an emphasis on strategic management competitiveness measures in place supporting e-retail industry (Svatosova, 2020).

The definition of e-commerce is the buying of goods and services via electronic means by use of computer networks or wireless devices such as mobile phones, Ipads, and tablets. In the scope of our research, this will exclude media downloads or streams and will concentrate on merchandise in B2C and C2C markets. E-commerce is also synonymous with online shopping, e-commerce, online stores, e-tailers, retailers, and online consumers, and is not limited to electronic funds transfers (EFT) and electronic exchange communications (EEC). Incorporating sustainability in e-commerce aims successful and long term growth in e-retail by implementing sustainable practices (Xie & Wang, 2021). In addition, Nguyen in his study indicates the importance of sustainability reporting is to ensure integrated sustainable e-commerce that will add the value to online shopping firms (Nguyen, 2020).

Why is it important to care about the environment by using compostable, recyclable, and reusable packaging materials? Statistics show that due to the growth of e-commerce a third of the world is filled with garbage (Escursell et al., 2021). A recent study shows that the high growth of e-commerce globally has led to unprecedented environmental impacts (Rijal & Lin, 2021). Rijal stated in his study that more than 3 billion tons of waste end up in landfills every year. Most come from packaging materials which are plastics, nylons, and cardboard boxes that result on land, water, or air pollution. Steps and action need to be taken to address packaging materials in e-commerce platforms so that retailers offer sustainable packaging materials.

Therefore, there is a need for collaboration between the producers and retailers in e-commerce platforms, to source their packaging materials from suppliers who comply with sustainability statements, values, and missions (Coelho et al., 2020). Manufactures must produce packaging materials that are in align to the 3Rs: recycle, reduce, and reuse (Berriman, 2020). Recent research has shown that companies and retailers who are ecologically friendly have secured a larger market share of consumers who are already paying a higher price for sustainable products (Smye, 2020). Some e-commerce brands have gone further and partnered with eco-friendly business companies that support environmental protection (Mohammed et al., 2021) and conservation concepts. Consumers, retailers, and environmentalists have supported companies who only produce environmentally friendly packaging materials (Oláh et al., 2020; Dunkovic et al., 2022). Also, governments give tax exemptions and relief to such companies of which is lacking in Kenya. Beavis states that consumers will even volunteer to partner with firms that produce ecologically friendly packaging materials in their initiative projects (Beavis, 2020). This can include planting trees and making the world green, regenerating, and preserving biodiversity. This is to say that retailers that offer sustainable packaging solutions focus on reusability and in return increase customers' brand loyalty (McGuire & Lincoln, 2020). Proactive environmental strategy must be adopted for sustainable development in business and organizations (Ahmed et al., 2021).

1.2. Right policies in place guarantee sustainable e-commerce

It is of great importance that retailers have policies stipulating sustainability or sustainable e-commerce in their mission, vision, and core objectives. Similarly, should let all stakeholders know that will partner with suppliers, manufacturers, and logistic supply providers who are compliant with green standards and sustainability. Retailers who ensure this will be opening their doors to customers who are keen on supporting sustainable e-commerce. There will be large market share for retailers who offer more durable and high-quality and eco-friendly products. According to this research consumers value much more online stores that are aligned to sustainability policies in the conduct of their businesses (İzmirli et al., 2020). Similar study by Wang argues that e-commerce platforms that offer customers with products that are eco-friendly to their health are the most embraced enterprises (Wang, 2020). Therefore, customers become loyal to such brands. In return retailers who care about the wellbeing and economic value of their customers stay in the business in long term. Castellini urged most customers are inclined to companies that uphold sustainable practices (Pereira-Moliner et al., 2021) and integrate environmental, social and economic dimensions in the mission, vision, core values of e-commerce firms that support sustainability increase demand for such commodities is on the rise (Pimonenko et al., 2021).

Retailers who want to win this large group of shoppers and retain them as customers need to understand that eco-friendly products play a crucial role in sustainable e-commerce. According to recent research, customers would more be inclined to partner with such companies that focus more on environmental sustainability, therefore, has an impact on their purchasing decisions (Ruben et al., 2020; Brătianu et al., 2020).

From the above arguments, retailers who do not support and implement sustainability strategies are at risk of collapsing. This conclusion can be drawn from the previous research work of Lin and others confirming companies that implement eco-friendliness, eco-products, and eco-friendly environmental policies are in demand. Further stated businesses will boom on e-commerce platforms if all stakeholders will corporate and work as a team in policy implementation supported by the government. Millennials are even more conscious of eco-friendly products who are the major online shoppers (Lin et al., 2020). Eco-friendly companies will have a long-term relationship with customers who have greater appetite to purchase

sustainable products and increase efficiency in the use of eco-friendly energy (Streimikiene, 2022) that is friendly to the environment hence supporting e-commerce sustainability (Kim et al., 2021).

1.3. What do consumers pay attention to while shopping online?

This study discusses various ways that e-commerce can become more sustainable. Most customers demand for eco-friendly products on environmental impacts (Elgaaied-Gambier et al., 2020). Poor products that do not meet the standards shortens lives, compromises future generations and impacts people negatively both socially and health-wise (Bilal et al., 2020). In addition, there is a great concern about the high levels of shipments of products from different parts of the world to various destinations through e-commerce platforms. Customer would like to buy food from the e-commerce firms with sustainability trademarks and have a good reputation due to concern of their healthy (Füzesi et al., 2018). This means huge emissions of carbon dioxide which pollute the environment daily, that cause climate change (Streimikiene, 2021) and contribute to respiratory pollution from smog and air pollution. In recent research better ways of shipping have been discussed to endeavour to develop and attain sustainable shipping solutions. According to Villa retailers need to choose environmentally friendly shipping companies that care about their customers and the health of the community at large (Villa & Monzón, 2021). He suggested companies that prefer to use new technology such as electric vans, drones, and bicycles, for their deliveries are more favourable to customers who have great concern for their environment (Patella et al., 2021). In his research indicate that retailers who partner with eco-friendly shipping companies' solutions will not only increase their sales but also stand to acquire new customers. Similar research shows that companies that are climate-neutral and provide environmentally friendly shipping solutions are going green, and total zero climate change will be in high demand for their approach to sustainable e-commerce growth in green development, in realities and myths (Mandilas et al., 2010). Furthermore, retailers should have clear communications between logistic companies and their customers to avoid high returns because this hurts environmental pollution. Retailers should be in constant communication with their customers before, during, and on the delivery date (Rese, & Baier, 2020), to avoid deliveries when the customers are not available to receive the products. Alternatively, they can coordinate with the local postal company or establish pick-up points where customers can pick their deliveries up later.

1.4. Who are the beneficiaries of sustainable e-commerce?

According to Zhang consumers are much happier and more ready to remain loyal to a particular brand once they receive sustainable, durable, and high-quality products (Ahmad & Zhang, 2020). Customers will partner and become brand ambassadors with no pay, just to influence their relatives to buy such brands (Yu & Kim, 2020). Likewise, customers would state retailers are mindful of the health and environment of their consumers. In a report by Juliet Orji et al. show that respondents value sustainability-oriented e-commerce platforms hold health and the environment in high regard (Juliet Orji et al., 2022). Sierra urged policy development to ensure that customers get e-co-friendly products for their money (Giurca et al., 2022). Ultimately, sustainability and environmental impact on sustainable e-commerce are intertwined (Dutta et al., 2020). Therefore, for a win-win solution, all stakeholders involved in the supply chain must uphold to sustainability policies and values (You, 2020). Retailers, by actively promoting sustainable e-commerce will, in return, be increasing customer loyalty and increasing sales, and hence profits.

However, the major challenge is to address sustainability in e-commerce to ensure continuous growth. Sustainable e-commerce will in return provide job creation, high-quality products at cheaper prices, convenience, and easy e-payment. But it does not yet address environmental impacts, packaging, shipping options, logistics, or delivery times. Once these challenges are solved, the e-commerce landscape, not only in Kenya but also in Africa as a whole, will flourish and be guaranteed for future generations. It is of pertinent concern that all the stakeholders come together and prioritize sustainable e-commerce.

In the literature review, this study used a theoretical and conceptual framework in sustainable e-commerce to ascertain the relationships of the study constructs. The theoretical and conceptual frameworks used for the study is shown below. It also provides the background and development of the study, i.e. how the theoretical and conceptual constructs influencing sustainable e-commerce are connected (Tran, 2021). Theoretical and conceptual framework of the study is shown on the *Figure 1*.

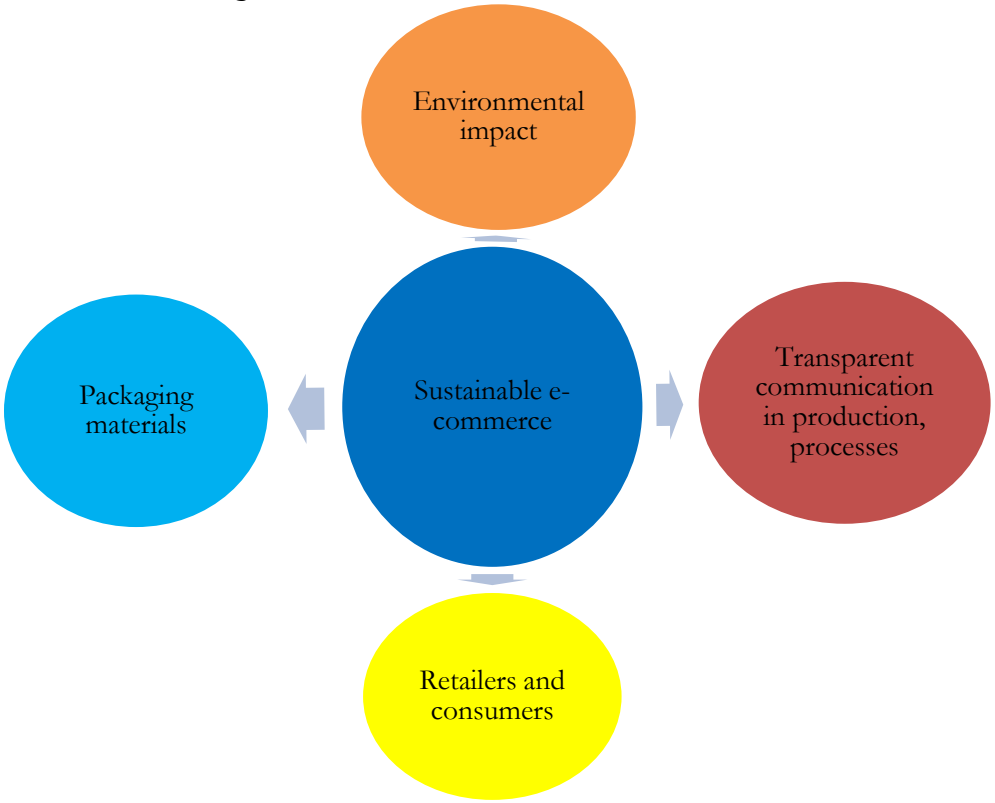


Figure 1. Theoretical and conceptual framework of the study
Source: Authors' editing (2022)

2. Methodological approach

In this study mixed methods have been used, i.e., quantitative, qualitative and cluster analysis approaches. The quantitative method is an online survey that was sent to consumers of online products and services. A sample of 501 respondents was drawn up, and the responses were analysed using the Statistical Package for the Social Sciences (SPSS version 24) and incorporated in our results. The quantitative data was collected from an online survey that used purposive and convenience sampling due to the nature of the study. The study was reviewed and approved by the Research Ethics Committee of the University of Debrecen before the study began.

A structured questionnaire was used. Before it was distributed a pilot questionnaire was sent out to five respondents, to gauge the ease, understandability, and clarity of the questions.

The feedback from the sample pilot survey was incorporated in the final questionnaire and was again re-checked by the supervisor to make sure it collected the data intended for the study. The questionnaire was social demographic, sustainable e-commerce, and environmental impact on packaging materials. If these issues are addressed then e-commerce sustainability will be achieved (Escursell et al., 2021; N. Singh & Sahu 2022).

The questionnaire used a 5-point Likert scale, where 1 denotes 'strongly disagree' and 5 'strongly agree' with the statement in the question. It targeted people who are digitally literate and frequently visit the websites of online stores to order products or services.

Therefore, 90% of the respondents are in the millennium generation age bracket, i.e., between 18 and 35 years, who make up the students in the universities in Kenya and are those consumers who regularly patronize e-commerce platforms.

On the other hand, the qualitative method used structured interviews from two companies that operate online stores, Jumia and Safaricom, marked as X and Y. The interviewees are experts and top senior employees of the two companies. The top senior employees and experts were chosen to collect the feedback and responses that are received about the brands from their consumers. For quality purposes, the questions were prepared in advance and sent to the interviewees so that they could adequately prepare. The responses from the interview were used to form case studies from the two companies.

In addition, secondary data from the previous literature reviews on sustainable e-commerce challenges to online businesses were applied. In addition, the main reasons for the interviews were to assess the increasing demand from consumers for environmental impact- and eco-friendly, durable, and sustainable products. The social demographics, gender, education level, and frequency of online shopping in quantity and percentage %. Sample statistics from the survey is shown on *Table 1*.

Table 1. Sample statistics from the survey

		Frequency (n)	Percentage (%)
Gender	Female	252	50.2
	Male	249	49.8
	Total	501	100
Education level	Bachelor's	282	56.3
	Master's	142	28.3
	Ph.D.	30	6
	Lecturer	28	5.5
Participants	Consumers	17	3.3
	Retailers	2	.6
Frequency/month on online shopping	Once	100	22.5
	Twice	95	24.5
	Three times	90	26.5
	> 4 times	75	27.5

Source: Authors' editing (2022)

The interviews were conducted with experts who are retailers in sustainable e-commerce. Because customers frequently give reviews on the retailers' websites (Wright & Lund, 2000). SPSS vs 24 and Microsoft 360 were used for data analysis. Cluster analysis was used to evaluate and investigate the impact and significance of the developed countries in Europe on e-commerce sustainability practices. The results are depicted on results on table 6 and 7.

3. Empirical results and discussion

According to Anwyl-Irvine, it is vital to conduct several analytical tests to ensure the instruments used to collect data meet the threshold and the research attains its objectives (Anwyl-Irvine et al., 2021). Therefore, in this study tests were as follows: reliability and validity assessment of the scale; collinearity assessment, and partial least squares structural equation model. Subsequent tests were performed on the challenges facing sustainable e-commerce. The following abbreviations are used: Environmental impact=EI, Better policies= BP, packaging materials =PM and beneficiaries of sustainable e-commerce BE.

3.1 Reliability and validity

Cronbach's alpha (CA) is used to measure composite reliability (CR). The rule of thumb states that reliability in a test is achieved when its scale value is greater or equal to 0.7. Table 2 shows the results of the reliability and validity test. From Table 2, the lower values of CA are (0.789; EI scale), (0.889; BP scale), (0.867; PM scale), and (0.825; BS scale) respectively. Obtaining values higher than 0.7 means that all the research constructs are reliable and therefore, the validity test can be conducted. This is tested from convergent validity, which is measured and pronounced to be valid when the average variance extracts (EVA) meet the threshold of value of 0.5 or higher and the outliers' loads values are greater than the threshold value of .7. EVA values in all scenarios are 0.792, .751, 0.742, and 0.701, respectively and the outliers' loads are between 0.768 and 0.889, as shown in Table 3 below, and therefore the validity test is achieved.

Similarly, Mandal state that it is very important to test the relationship between the independent and dependent variables in the regression model (Mandal & Maiti, 2022). This is measured on the variance inflation factor (VIF). The rule of thumb is that if the VIF is higher than 3, then there is collinearity. However, VIF values below 3 mean there is no collinearity. In our case, the value of the VIF was 1.423, Thus, there was no collinearity in the independent variables, but they influence each other. The correlations between the constructs were tested by performing a hoterotrait-monotrait ratio (HTMT) on discriminant validity. Its threshold from the study is 0.865. The value for HTMT is 0.423, which is below the threshold of 0.865. Therefore, we conclude that all the discriminant validity is eliminated. Reliability and validity tests is shown on *Table 2.*

Table 2. Reliability and validity tests

Constructs	Outlier loadings	CA	CR	AVE	VIF Value		HTMT Value	
					EI	SE	SE	PM
EI	[0.768-0.897]	0.789	0.887	0.751				
BP	[0.756-0.923]	0.889	0.901	0.742				
PM	[0.745-0.892]	0.867	0.891	0.701		1.423	**0.465**	
BS	0.731-0.889]	0.889	0.825	0.867	1.282	1.465	0.612	**0.423**

Note: CA: Cronbach's Alpha: CR: Composite Reliability; AVE: Average Variance Extracted
EI: Environmental Impact; BP: Better policies; PM: Packaging Material; BS: Business Growth
Source: Authors' editing (2022)

3.2. Pls-Sem

The partial least squares path modelling (PLS-SEM) was used to test sustainable e-commerce on the four hypotheses. Tests are based on the area of environmental impact, achieving and communication of sustainable e-commerce, packaging materials, and benefactors of the sustainable online businesses. The skewness of the statistical respondents assumes a normal distribution. We use the bootstrapping method to measure distribution with a repeated sample size of 5100 for the initial smaller sample size of 501. The results from this study show that all the hypotheses - H1, H2, H3, and H4 - are supported with a level of significance of 95% (p-value =0.000<0.005). Table 3 shows the relationships among the hypotheses. Evaluated by Beta factor β, and standard deviation, the significance level is 95% (p-value =0.000<0.005).

In this study, we purposely did not include moderator or mediating effects to ensure the simplicity of the study and avoid a complex analysis. Environmental impact (EI) has a positive and significant impact on sustainable e-commerce (β=0.594, p-value 0.005). Better policies (BP) have a positive and significant impact on sustainable e-commerce of (β=0.462. p-value 0.005); however, packaging materials have a more positive and significant impact on the environmental impact than on sustainable e-commerce with a value of (β=0.354, p-value=0.005); last is the ripple effect of sustainable e-commerce on both retailers and consumers that has a lasting effect on customer satisfaction and leads to brand loyalty and thus an attractive reputation. The BS value is (β=0.145, p-value 0.005) that analyses the integration of sustainable e-commerce with environmental impact needs to be investigated further. PLS-SEM test that is used for predictive and exploratory evaluations on casual relationships and impact among the variables postulated in the theoretical. PLS-SEM tests on casual relationships and variables is shown on *Table 3.*

Table 3. PLS-SEM tests on casual relationships and variables

Relationship	Hypotheses	**β**	STDEV	P Values	Result
EI>SE	H1	0.594	0.041	0.000	Supported
BP>SE	H2	0. 462	0.031	0.000	Supported
SE>BG	H3	0.354	0.045	0.000	Supported
		0.145	0.015	0.000	Supported

EI: Environmental Impact; BP: Better policies; PM: Packaging Material; BS: Business Growth.
Source: Authors' editing (2022)

3.3. R2, f2, Q2 tests

Coefficient determination (R2)

In social research into consumer behaviour, the threshold value of R2 is 1.0, showing that the given data perfectly fit the linear model of the equation. A value of R2 0.5 or below shows that some variability that is contributed by independent variables is acceptable. By the results of this study in Table 4 below, the EI is 0.312, which is below the threshold by a small margin, meaning there is no great deviation from the acceptable value. Sustainable e-commerce (S.E) has an R2 value of 0.420, equivalent to the acceptable threshold, therefore giving the S.E. a prominent and achievable target.

Frequency strength

F2 determines the strength frequency in related constructs. F2 values of 0.02, 0.15, and 0.35 are the weak, moderate, and strong thresholds. Table 4 shows the frequency strength on R2, F2, and Q2.

Predictive relevance (Q2)

Q2 indicates the predictability and exploratory power of latent variables. In a situation where the value of the Q2 is higher than 0, the model is said to be important and predicts better relevance. All the values of

Q2 are higher than 0 (Q2EI=0.122, and Q2S.E=0.330), thus the model has a better predictive relevance. R2, F2, Q2 test results is shown on *Table 4.*

Table 4. R2, F2, Q2 test results

Constructs	R2	F2	Q2
EI	0.12	0.243	0.122
SE	0.420	0.025(EI)/0.395BP	0.130

EI: Environmental Impact; BP: Better policies; SE: Sustainable E-commerce

Source: Authors' editing (2022)

In terms of the qualitative method, the interviewers took as little time as possible from the experts and retailers as they were still working in their stores. The interviews were meant to show the importance sustainability department for the companies that are involved in e-commerce platforms. Interview schedule both interviewees is shown on *Table 5.*

Table 5. Interview schedule both interviewees

Interviews	**Company**	**Interviewee**	**Date**	**Duration**
Interviewer 1	X	Sustainability mgr.	21/02/2021	15 minutes
Interviewer 2	Y	e-commerce mgr.	22/02/2021	10 minutes

Source: Authors' editing (2022)

On cluster analysis e-commerce enterprises with total turnover and with more than 10 employees excluding financial sectors. The enterprises with e-commerce platforms in percentages. The firms were collected from Eurostat's 2021, with employees more than 10 excluding financial firms. From the fig 2 it can be seen clearly most the e-commerce firm are well established and practice e-commerce sustainability policies. The turn in most developed countries is above 15% which in developing countries is below 15% of the total turnover sales in e-commerce. E-commerce enterprises with total turnover and with more than 10 employees excluding financial sectors is shown on *Figure 2.*

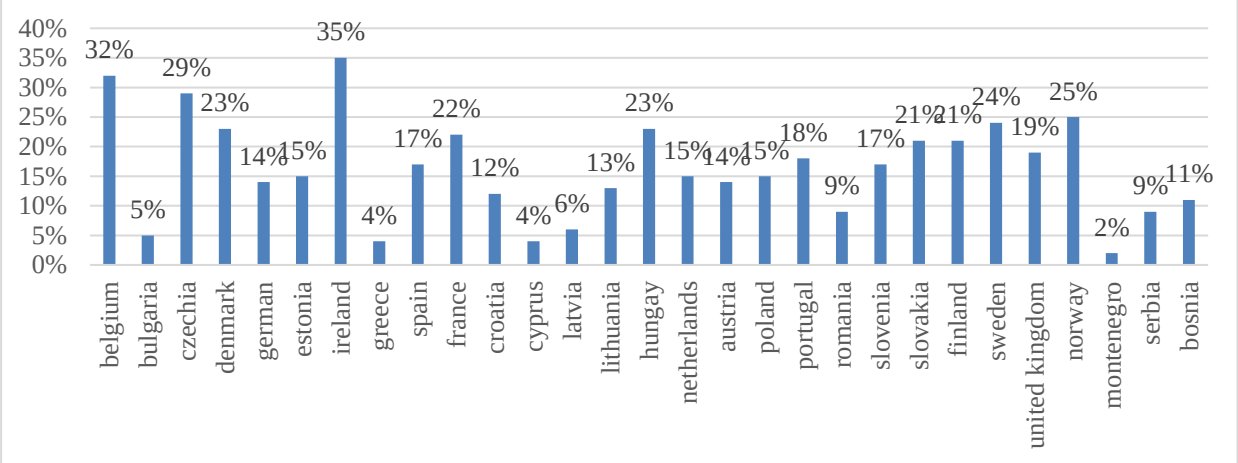


Figure 2. E-commerce enterprises with total turnover and with more than 10 employees excluding financial sectors.

Source: Authors' editing (2022)

E-commerce enterprises with total turnover and with more than 10 employees excluding financial sectors. Ireland and Belgium are doing much better with 35% and 32%, followed Czechia, 29%, Norway 25% Sweden 24%, Hungary 23%, Denmark 23%, France 22%, Slovakia and Finland 21%, UK 19%, Portugal 18%Slovenia and Spain 17%, Poland, Netherlands, and Estonia 15% while the rest being below 15%.

The means of four clusters and seven variables: 4 k-Means of different e-commerce models. e.comm, e.comm_web, e-.comm_EDI, e.comm_B2C, e.comm_B2C_B2G, e.comm_B2C_10, and e.comm_B2C_20. The graph present function in terms of cost of doing business under various clusters to establish the best cluster that practise e-commerce sustainability policies from the seven evaluated in the four clusters. As it's indicated from the results cluster four with sustainability policies is of going concern. Presents means of four clusters and seven variables for e-commerce sustainability is shown on *Figure 3*.

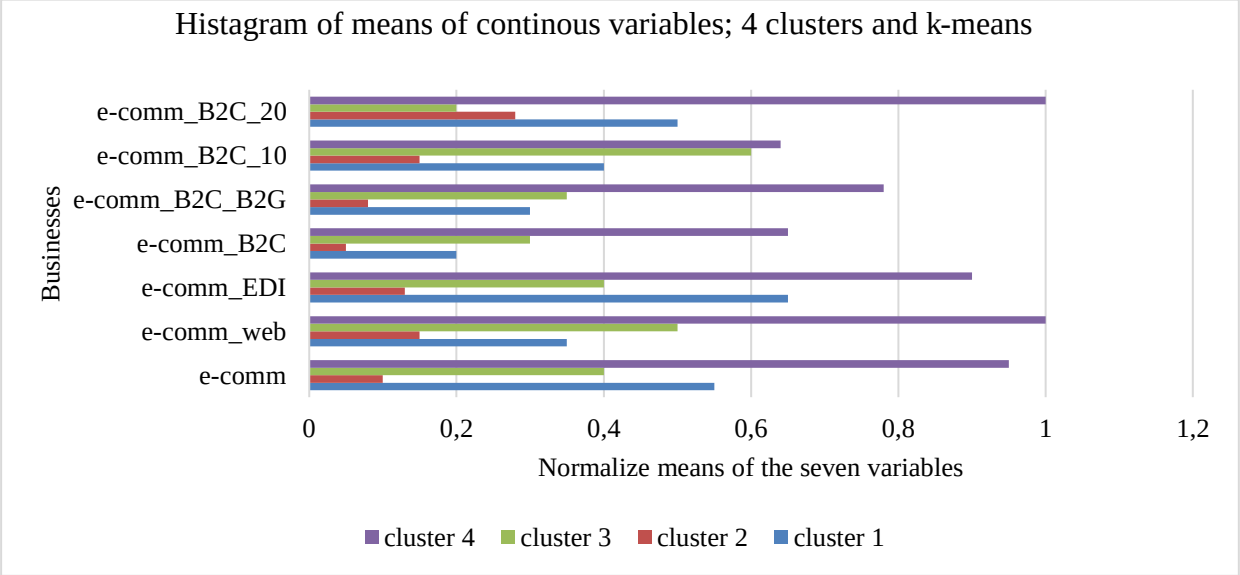


Figure 3. Presents means of four clusters and seven variables for e-commerce sustainability
Source: Authors' editing (2022)

The ANOVA analysis, K-means clustering with 7 variables, 4 clusters, 29 countries selected from Eurostat. The four cluster were justified to be statistically significant at 1% for all variables. ANOVA analysis for continuous variables, 4 clusters and 29 countries from Eurostat is shown on *Table 6*.

Table 6. ANOVA analysis for continuous variables, 4 clusters and 29 countries from Eurostat.

	ANOVA for continuous variables: Number of clusters: 4, total number of countries case: 29					
	Between SS	df	Within SS	df	F	p-value
e-comm	1514, 163	3	476,389	25	26,487	0,000***
e-comm_web	244,700	3	90,472	25	22,539	0,000***
e-comm_EDI	697,115	3	320,333	25	18,135	0,000***
e-comm_B2C	29,158	3	26,083	25	9,316	0,000***
e-comm_B2C_B2G	95,717	3	54972	25	14,510	0,000***
e-comm_B2C_10	454,568	3	367,639	25	10,304	0,000***
e-comm_B2C_20	121,413	3	87,139	25	11,611	0,000***

***Statistically significant at 1%

Table 7. Presents mean values for all seven variables for each of the four clusters. The highest mean values for all seven variables are for Cluster 4 where are grouped Belgium and Ireland. However, comparing all seven variables, the highest mean value has variable Enterprises' total turnover from e-Commerce for Cluster 4 (33,50). The lowest mean values for all seven variables are in Cluster 2, especially for variable Enterprises' turnover from web sales – B2C (1,33). Table 7. Mean values for each of the four clusters to the seven variables in 29 countries of the data available for e-commerce enterprises 2022. Presents seven mean variables cases of the four clusters is shown on *Table 7.*

Table 7. Presents seven mean variables cases of the four clusters

	Cluster 1	**Cluster 2**	**Cluster 3**	**Cluster 4**
e-comm	19,83	5,00	15,44	33,50
e-comm_web	6,08	2,67	7,56	15,00
e-comm_EDI	13,50	2,33	8,00	19,00
e-comm_B2C	2,25	1,33	3,00	5,50
e-comm_B2C_B2G	4,08	1,67	4,56	9,50
e-comm_B2C_10	12,92	7,33	17,89	18,50
e-comm_B2C_20	4,42	2,67	1,89	10,00
Number of cases	12	6	9	2

Source: Authors' editing (2022)

3. Conducting research and results

Through the quantitative part of the research, the focus was on data collecting, processing, and analysis. A nine-level Likert scale was used to measure the perceptions and assessments of the respondents, on the dependent variable (transitional crisis), as well as the independent variables (heritage of socialism, geopolitics, nomenclature authorities, deficit of institutional changes, and neoliberal ideology), in a survey that was applied during the research. In measuring the dependent variable (transitional crisis), the scale marks were set from the lowest (1) to the highest (5). Regarding the independent variables, the negative impact was measured from the minimum negative (1) to the maximum (5) on the dependent variable. The survey included filling out 500 questionnaires for each country (Montenegro, Serbia, and Bosnia and Herzegovina), which made a total of 1,500 respondents. Collected data for this study were processed by SPSS software. According to the purpose defined in the hypothesis of work, descriptive statistics were used for the data analysis, correlation analysis, and multi-correlation. The multiple linear regression model was applied after (the method of least square), as well as hierarchical multiple regression model.

3.1. Application of multiple linear regression analysis

Before the regression analysis the descriptive statistics was performed. From the obtained results, the relevant results were singled out in the *Table 8.*

Table 8. Means end standard deviation

Variables	Montenegro		Serbia		Bosnia and Herzegovina		Total	
	Mean	Standard dev.	Mean	Standard dev	Mean	Standard dev.	Mean	Standard dev.
Crisis	2.7590	.73655	3.2590	.73655	3.7515	.72212	3.2560	.83582
Path depend.	2.8679	1.07412	3.8120	1.09666	3.8610	1.07260	3.5154	1.17298
Globalization	3.8940	.67652	4.3060	.52241	4.0560	.61776	4.0853	.63165
Politics	2.6320	1.28720	3.1120	1.25363	3.5431	1.15498	3.0953	1.28699
Institutions	3.5990	.78161	4.0870	.76229	4.5020	.49849	4.0613	.78485
Neoliberalideo.	3.3236	.88945	4.4260	.53861	3.9279	.53755	4.1278	.76309

Source: *own compilation*

For all three countries:

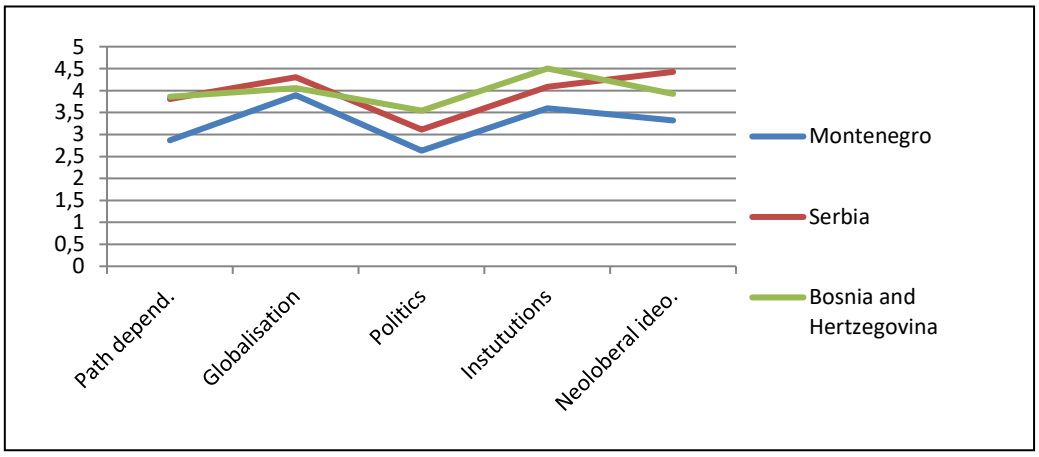
$$\bar{Y} = b_0 + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + b_5 X_5$$

ZaX_1 =3.51. X_2=4.08. X_3=3.09. X_4=4.08 X_5=4.12

$$\bar{Y} = 4.63 - 0{,}21 X_1 - 0.23 X_2 - 0.03 X_3 - 0.31 X_4 - 0.26 X_5$$

$$\bar{Y} = 3{,}25$$

The level of transitional crisis is the largest in Bosnia and Herzegovina (mean is 3.75), then in Serbia (mean is 3.25) and the lowest is in Montenegro (2.75). Comparation of means by variables is shown on the *Graph 4*.



Graph 4. Comparation data by countries
Source: *own data*

The *Graph 1* shows that the level of different perception of independent variables in different countries. Bosnia and Herzegovina regarding the level of transition crisis is in worst situation than Serbia and Montenegro. Also, the negative influence of independent variables is the stronger in Bosnia and Herzegovina, after that in Serbia, then in Montenegro. Montenegro is in better situation than other countries, in all researched aspects. The existence of differences is expected because in the previous process of transition various economic, political, institutional and social changes have been realized. There are also other factors which have not been examined in this paper. Still, presented results clearly show similarity of models of influence and functional dependency, on the basis of common factors of influence research.

Conclusion

Sustainable e-commerce is the backbone of the sustainability and growth of online businesses (Schoneveld, 2020). Therefore, to retailers and customers of e-commerce cannot separate sustainable e-commerce from environmental sustainability. If online stores support policies that govern sustainable commerce, then without no doubt online business will flourish, presenting a greater opportunity for business growth (Calderon-Monge et al; 2020; Yayla et al. 2021).

It is absolutely that everyone desires a sustainable life that will be enjoyed if the three dimensions of sustainability are practiced. However, retailers and consumers must focus their minds on sustainable business solutions. Adejumo emphasize that it is only retailers who adopt technology-driven and sustainable solutions and are courageous enough to be responsible to lead the way in sustainable businesses will ultimately make profits in the long term (Adejumo et al., 2020). Most of the sustainable e-commerce solutions for retailers lie in businesses' ability to make profits and have a long-term impact on their customers on eco-friendly environment. By using recyclable packaging materials, prioritizing sustainable e-commerce philanthropy, and environmentally friendly business practices. Such as practising green technology in production and distribution, charity donations, and support for projects to reach needy communities in areas of sustainability. For example, telling customers that if they buy a pair of sustainable shoes, they will protect environment for long life and contribute $1 to donations that support children without shoes, and thus increase social interactions in society (Metzker et al., 2021).

A green environment and eco-friendly products are the desire of every consumer (M. Singh & Sahu, 2020). According to Francesca stated that there is a high demand for healthy and less harmful products among consumers (Francesca & Elisa, 2020). Research shows that sustainable e-commerce can be the solution to the environmental issues suffocating the world, ranging from pollution and climate change through green policy initiatives that are implemented to see sustainability become a priority (Verbruggen & Brauers, 2020). Designing eco-friendly and durable products, and packaging them in the right size of the right material, which is recyclable, reusable, and decompose is an attempt to achieve e-commerce sustainability (Wang et al., 2020).

Similarly, for retailers, brands, and online stores who want to go green and do sustainable e-commerce, this does not mean that they will suffer a financial burden. But a necessity, especially when practise to have transparency and open communication about their processes, systems, shipping, and packaging will boost e-commerce sustainability and adventure in the tourism industry (Valentinas et al., 2021). It will only be a matter of time before all consumers become responsible and sustainable e-commerce. Coincidentally, customers will become their marketers by word of mouth, acting for free, and become loyal to their brands (Cheng et al., 2021). This will help the retailer to have a positive brand image globally.

Our results are in agreement with other studies as follows; by having sustainability policies in place and implemented results to competitive advantage and synergetic relationships where by this will lead to sustainable e-commerce with all stakeholders (Pereira-Moliner et al., 2021). In line with policy implementation, it will attract countries that uphold sustainable e-commerce and can partner to achieve a greater transformation. In eco-friendly products, and low emission of gases to minimize the pollution hence economic growth and ecological atmosphere in all sectors as we realize vision 2030 17 sustainable goals (Pimonenko et al., 2021). Finally, when all stakeholders agree to capitalize and adopt eco-friendly products and provide, and protect ecological environment, this will ensure that e-commerce business will thrive for the long term in the sharing economy that advocate efficiency and effective use of resources in environment, economic and social dimensions (Valentinas et al. , 2021).

The findings indicate clusters across all the seven variables. Cluster 4 shows these the two countries Ireland and Belgium have tapped in the use of good infrastructure in ICT and emerged victorious competitive advantage and synergies. Cluster three these are countries that are in the developing stages but not yet fully realized the benefits of e-commerce sustainability and environmental sustainability due to lack of synergy and integration. While cluster two are disadvantage in low uptake and digitization of business enterprises therefore the mean values of the countries in sustainable e-commerce might not be realized the enterprises do not embrace sustainability in all dimensions. Finally, cluster 4 is the category of the countries that developing and incur high cost to put the ICT infrastructure in place to support e-commerce enterprises and migrate to digitization. Therefore, will be lagging much behind to actualize vision 2030 in sustainable business processes. During pandemic most of the countries adopted e-commerce (Scutariu et al., 2022).

The results show from web sales and e-commerce bringing competitive advantages and synergies among the countries practising sustainable e-commerce in a sharing economy in various sectors (Pereira-Moliner et al., 2021). Therefore, it is apparent that the significant difference between the selected European countries regarding the usage and quality of web sales and e-commerce practices exists (Zoroja et al., 2020).

The limitation of this study is that it was not possible to get an interview with a government official from the field of commerce and information communication technology. The concerned parties were not available for questioning. In addition, there are missing elements and shortcomings on the website of the two sectors. In terms of sustainability policies, the government should enact policies that support retailers and consumers in sustainable e-commerce. Especially, in small and medium enterprises to overcome competition from international brands that have taken over e-commerce in Kenya. Furthermore, the lack of a database is a great challenge in Kenya in monitoring the performance of the retail industry in e-commerce firms. Most of the policies exist in written form but are not implemented by the government, so intervention is needed from the two ministries to work together with consumers and retailers. Besides, the sample size was small and might not have given a truly representative picture of the entire population.

Future research directions should be focused on government ministries concerned with the e-commerce industry, the adoption of sustainable business practices in e-commerce with other relevant combinations of big data analytics (BDA), social commerce (S-commerce), and mobile commerce (M-mobile). Policy implementation is key to the growth of e-commerce and the retail industry (Stafford et al., 2020).

The practical implication from the study has already been indicated, i.e. sustainable e-commerce can be attained if all stakeholders can work together (Jun et al., 2021), starting with customers. Most customers advocate for sustainable products with an eco-friendly environmental impact. Retailers must ensure they have open and transparent communication about their production processes and systems that support sustainability practices that will build trust in the minds of customers. On the other hand, the government must advocate and implement policies that are following sustainable consumption and production. Regarding the three dimensions of sustainability, environmental, social, and economic dimensions protect the environment and offer consumers better health, and better living stands and empower small and medium enterprises in the e-commerce industry (Cheba et al., 2021). The recommendations are important to all retailers, suppliers, the government, and manufacturers. Must be to comply with sustainability practices (Jiang et al., 2020) to reduce pollution, introduce recyclable packaging, have a positive environmental impact and focus on social engagement.

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