

Prioritizing big data applications in E-commerce considering sustainable development indicators

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ABSTRACT

During the Covid-19 pandemic, when strict restrictions were imposed to protect public health, e-commerce played a significant role in providing products on time. E-commerce technology and big data analytics enable companies to gain competitive advantages and respond to customers more efficiently. To make e-commerce more sustainable, the three dimensions of sustainability must be met, otherwise it can have negative consequences that lead to ecosystem destruction. Thus, e-commerce must learn how to effectively manage certain aspects of sustainability and adapt its operations to achieve balance. E-commerce's impact on sustainability can be measured in three pillars: economic, social and environmental and achieving a balance among these is the ultimate goal of sustainable development. Although the sustainability issue and big data analytics have gained increasing popularity in recent years, there is still a gap in evaluating applications of big data based on sustainable development indicators. In this study, we used a hybrid multi-criteria decision-making technique combining fuzzy TOPSIS and BWM to assess big data applications in e-commerce considering sustainable development indicators. The results showed environmental sustainability and energy consumption efficiency received the highest weight for the main pillars and sub criteria of sustainability indicators. Coordinating and monitoring supply chain processes, innovating product, process and business models, and creating new products and services are the top three applications of big data in e-commerce considering sustainable development indicators. E-commerce managers and experts can make better decisions about sustainable approaches by prioritizing big data applications based on sustainable development indicators. In addition, the proposed approach can also be used to evaluate big data analytics in other industries that consider sustainable development indicators.

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1. Introduction

The e-commerce industry grows rapidly worldwide every year. As a new phenomenon in the digital economy, online commerce plays a crucial role in global economic growth (Goldfarb, 2019). Online stores have the advantage of enabling buyers in different countries to make purchases thanks to the internet (Ingaldi, 2019). In 2018, 43% of online purchases were made online compared with 32% in 2015 (Escursell et al., 2021). In response to the Covid-19 pandemic, many physical stores have started selling online, resulting in an increase in virtual visits. Many consumers have changed their purchasing habits as a result of the pandemic, making their first purchases online (Kim, 2020; Mirza et al., 2020). In addition to making shopping easier for customers, e-commerce can also increase efficiency and improve customer service (Haryanti, 2022). The global retail industry has been transformed by e-commerce in recent years and as of 2020, e-commerce is growing by nearly 20% annually. In 2019, the global e-commerce market was estimated to be worth \$9 trillion, and it is expected to grow 14.7% between 2020 and 2027 (Rao et al., 2021).

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The demands on human resources continue to rise, but the natural resources to satisfy them do not. Since this phenomenon has been occurring, global concerns have always been expressed about wisely using the available resources to ensure the present generation's needs are always met without compromising the future generation's (Hák et al., 2016). Academics, governments, planners, and developers have taken notice of sustainable development. Governments and non-governmental organizations have embraced it as an appropriate paradigm for development in recent years (Mangiaracina et al., 2015; Mensah, 2019). In the absence of sustainable development, the ecosystem may be depleted due to negative consequences (Oláh et al., 2019). Research confirms that addressing sustainability issues is critical for companies to achieve long-term viability and prosperity. Focus on sustainability helps companies strategically improve performance, innovate and grow while achieving sustainable competitive advantage and creating sustainable value for society (T Shao & Z Liu, 2012). The Sustainable Development goal is to ensure that renewable natural resources are not wasted, destroyed or abused for the benefit of future generations. Furthermore, it includes the use of non-renewable resources in a manner that doesn't unnecessarily restrict future generations' access (Moldan et al., 2012). For all disciplines, sustainability is one of the key challenges of our century. An action which is in line with sustainable development must take into account at the same time the three main sustainable development domains (Lucia et al., 2022). Sustainable development aims to achieve social progress, environmental stability, and economic growth (Mensah, 2019). In order to accomplish this, economic, environmental, and social concerns must be integrated into decision-making processes (Kolk, 2016).

With the sustainable development of e-commerce, it is possible to increase the efficiency and effectiveness of operations, reduce the use of resources, reduce costs, benefit society by providing the best possible products and services, and create more job opportunities (Choi, 2014). It is important for e-commerce to be aware of sustainability and ensure that their activities do not endanger the planet's sustainability (Oláh et al., 2019). Internet penetration and the high number of mobile subscribers are driving exponential growth in e-commerce and resulting in growing three times faster than expected. Data has significantly affected e-commerce sector, and the success of e-commerce depends on their ability to effectively capture, store, and use the data (Zheng et al., 2020). Big data is becoming increasingly important in the e-commerce because it enables accurate analysis of customer behavior, market trends, demand characteristics, transaction and supply cycle processes, and so on (Akter & Wamba, 2016). There is still a critical gap that has not been filled by previous research in the area of big data analytics in e-commerce on the one hand, and sustainable development indicators on the other. Therefore, this study focuses on prioritizing big data analytics considering sustainability development indicators in the context of e-commerce, which can also be applied to rank other emerging technologies in e-commerce considering their effect on future sustainability.

2 Literature Review

2.1 Sustainable development

Sustainable development has become a generic development goal for international agencies, organizations, development planners and academic research (Mensah, 2019). In the early seventies, sustainable development was promoted to achieve a suitable environmental setting as societies and technology developed (Asr et al., 2019). Sustainable development can be described as the combination of two words: “sustainable” and “development”. Development is an evolutionary process in which people work deliberately and creatively to build new systems, overcome challenges, adapt to change and achieve new goals. This is the social condition of a country that meets human needs through the intelligent and rational use of natural resources and environment is another view of development (Mensah, 2019). Sustainability means the ability to maintain something, a result, or a process over time and continues to focus on human activity and its ability to satisfy human needs and desires without damaging or consuming productive resources (Basiago, 1998). While sustainable development has several definitions, the Brundtland Commission Report (Schaefer & Crane, 2005) is the most frequently cited one. They define sustainable development as meeting the needs of today without compromising the needs of future generations. Elkington (1994) addressed organizational sustainability in three dimensions: environment, society and economy, people and planet's impact on the environment and stakeholders. Economic growth, environmental protection, and social equality constitute the three pillars of sustainable development. Therefore, it can be argued that Sustainable development is based on three conceptual pillars. “Economic sustainability”, “social sustainability”, and “environmental sustainability” are the three pillars (Purvis et al., 2019).

2.1.1 Economic sustainability

In economics, the first solution to define sustainability was the systems approach, which proposed that sustainability can be achieved by balancing social, economic, and environmental goals Barbier, 1987. Economic sustainability is defined as meeting current consumption levels without negatively impacting future needs (Mensah, 2019). Energy use per capita, productivity, efficiency, the use of energy in economic sectors, import or export of energy resources, and strategic markets are some aspects of this pillar (Lucia et al., 2022). The environment and resources will be increasingly important to economic progress in the future (Moldan et al., 2012), since damage to the environment will prevent them from achieving their economic goals (Haryanti, 2022). In another definition the concept of economic sustainability refers to maximizing profits and ensuring a positive return for stakeholders by economizing resources. Accordingly should ensure that customers get

value for their money and are satisfied with their purchases by focusing not only on short-term goals but also on long-term ones Oláh et al., 2019.

2.1.2. Environmental sustainability

Environmental sustainability refers to retaining the productivity and resilience of the natural environment to support human life. This is based on the integrity of ecosystems and the carrying capacity of the environment as a source of economic inputs and as a sink for waste (Mensah, 2019). A compelling argument for environmental sustainability can be made by examining the effects of climate change on this sustainable development indicator. Human activities or natural climate variability cause significant and long-term climate changes. Some of the changes include warming of the atmosphere and oceans, diminishing ice levels, rising sea levels, acidification of the oceans, and an increase in greenhouse gas concentrations (Kumar et al., 2014; Lucia et al., 2022). Human welfare can be improved through environmental sustainability by protecting sources of raw materials used for human needs and preventing water sinks for human wastes from being exceeded (Moldan et al., 2012). A sustainable environment is one in which decisions and actions are taken to protect the natural world, with an emphasis on ensuring that human life can continue to be supported by it. Consumers continue to demand environmentally friendly products, expressing a willingness to spend more on green products. Consumers who are environmentally conscious prefer products and services that cause less environmental damage and are willing to avoid or switch brands when it comes to environmental concerns. The green consumer prefers products made of recycled or recyclable materials (Guckian et al., 2017).

2.1.3 Social sustainability

Social sustainability argues that poverty alleviation should not lead to unwarranted environmental destruction or economic instability. Poverty should be alleviated within the society's existing economic and environmental resources (Scopelliti et al., 2018). While the dynamics of environmental and economic systems are easily observed and can be modelled, the dynamics of social systems are highly intangible since it encompasses many issues such as human rights, gender equity and equality, public participation for sustainable development. Therefore It is difficult to achieve social sustainability because of the complexity and overwhelm of the social dimension (Saner et al., 2020). Cohesion and the ability of society to work together towards common goals are essential to social sustainability. As a society, we need to address the individual needs of health and well-being, nutrition, shelter, education, and cultural expression (Moldan et al., 2012). Social sustainability does not mean meeting everyone's needs. In other words, it provides the enabling conditions for everyone to be able to realize their needs. In order to progress toward social sustainability, individuals, organizations or communities should eliminate anything that impedes this capacity (Kolk, 2016).

2.2 Sustainable development and big data in e-commerce

In virtual markets, sustainability is viewed as a way to remain competitive, retain and attract consumers by providing less harmful products and services in the highest possible form, which will improve operational performance, efficiency, and effectiveness, minimize resource use and costs, and benefit society as well Faust, 2013. Although sustainability issues have gained increasing popularity in recent years and several authors have focused on sustainability topics associated with e-commerce (Mangiaracina et al., 2015; Rita & Ramos, 2022), there is no exhaustive research to enumerate sustainable development indicators in e-commerce. Contrary to sustainable development, there has been comprehensive research on the necessity of big data and its applications in e-commerce since it is becoming increasingly dependent on big data (Liu et al., 2019; Wamba et al., 2017). There are studies that have identified and ranked applications of big data in e-commerce according to their values and challenges, regardless of sustainable development indicators. In order to fill this gap, we aim to prioritize big data applications considering sustainable development indicators based on the applications presented in previous research (Akter & Wamba, 2016; Mohammadi et al., 2023). The rapid growth of e-commerce has implications for economic, social and environmental sustainability. In today's world, sustainability has been made the responsibility of every country, which makes the e-commerce sustainability alliance a promising development. Sustainable e-commerce focuses on the use of green products from the perspective of consumers and businesses and to achieve universal research results, the whole e-commerce community must participate (Haryanti, 2022). The sustainable e-commerce can be achieved through asset management, production cost control, factory management and e-commerce is not sustainable unless it changes due to increased demand for energy, storage space, bandwidth, and data centers (Ingaldi, 2019).

The three dimensions of sustainability must be implemented to make e-commerce more sustainable (Chen & Zhang, 2015 ; Oláh et al., 2019; Xie et al., 2023). It is useful to study the impact of e-commerce on aspects of organizational sustainability and learn about its benefits for business organizations. From an economic point of view, the elements of sustainable development can manifest themselves in the form of higher profitability, improvement of the trade balance and in the social pillar, new skills, jobs, gender equality, higher wages, and the fight against poverty are covered. Moreover, for the environment, reducing the emission of ozone-depleting substances, improving air quality, and reducing the consumption of packaging substances are emphasized (Chaudhary, 2017). The sub indicators of sustainable development in the context of

e-commerce based on three dimensions are presented in Table 1. Amornkitvikai et al., 2022 stated that sustainable e-commerce conformity requires consideration of environmental, social, and economic dimensions.

Table 1
Sustainable development indicators (SDI) in e-commerce

Main SD indicators	Symbol	Sub SD indicators	Reference
Economic	Ec1	Innovation capability	Biagi & Falk, 2017; Kennedyyd et al., 2022; Oláh et al., 2019 ;T Shao & Z Liu, 2012
	Ec2	Growth and financial benefit	Haryanti, 2022; Sun et al., 2021; Amornkitvikai et al., 2022; Oláh et al., 2019; Cano et al., 2022; Ingaldi, 2019 ; Escursell et al., 2021; Ignat & Chankov, 2020
	Ec3	Productivity	Haryanti, 2022; Shukla et al., 2018; Oláh et al., 2019; Ingaldi, 2019
Social	S1	Care customer and Complaint handling	Haryanti, 2022; Ingaldi, 2019; Shukla et al., 2018
	S2	Creates job opportunities	Haryanti, 2022; Cui et al., 2017; Sun et al., 2021; Ingaldi, 2019; Ignat & Chankov, 2020
	S3	Consumer Awareness	Kennedyyd et al., 2022; Oláh et al., 2019; Cano et al., 2022; Ingaldi, 2019; D'Adamo et al., 2021
	S4	Working condition (Safety, Health...)	Shukla et al., 2018; Ignat & Chankov, 2020; Marques et al., 2010
Environmental	En1	Control air pollution	Haryanti, 2022; Rao et al., 2021; Mucowska, 2021; Xie et al., 2023; Mangiaracina et al., 2015; Oláh et al., 2019; Rita & Ramos, 2022; Cano et al., 2022; Ingaldi, 2019 ; Escursell et al., 2021; Ignat & Chankov, 2020
	En2	Reusable Packaging and Product recyclability	Haryanti, 2022; Rao et al., 2021; Sun et al., 2021; Mangiaracina et al., 2015; Oláh et al., 2019; Rita & Ramos, 2022; Cano et al., 2022 ; Escursell et al., 2021 ;D'Adamo et al., 2021; Shukla et al., 2018
	En3	Improve shipping process	Haryanti, 2022; Escursell et al., 2021; Shukla et al., 2018
	En4	Energy consumption efficiency	Rao et al., 2021; Sun et al., 2021; Xie et al., 2023; Mangiaracina et al., 2015; Oláh et al., 2019; Cano et al., 2022; Shukla et al., 2018

An economic sustainability strategy consists of maximizing profits and ensuring adequate revenues for stakeholders by maximizing available resources. A company should focus on long-term and short-term goals by ensuring that the customers are satisfied with the products and services they purchase. It can be concluded that e-commerce has the characteristic of sustainable development. Positive and negative aspects can be distinguished from all aspects of sustainable development. E-commerce companies determine which factors will dominate and how they affect certain aspects of sustainability (Ingaldi, 2019). It is possible to assess negative effects from an economic viewpoint, such as higher production costs, lower efficiency, and a lower demand for products. There are social issues such as unemployment and public welfare issues; on the environmental side, there are consequences such as pollution of the air and water in nearby areas (Ingaldi, 2019). In the social dimension, human needs and cultural development are emphasized. As a result of e-commerce, some people will lose their jobs as traditional and physical shops are replaced by virtual ones, but it also creates job opportunities for entrepreneurs and those who are digitally literate (Biagi & Falk, 2017). Business activities can be conducted through e-commerce without having to travel. Online shopping and working from home could help reduce CO₂ emissions by reducing CO₂ emissions Song et al., 2020. In addition to reducing the need for personal travel, e-commerce can reduce the carbon footprint on the environment. However, e-commerce can negatively impact the environment by generating waste and increasing the amount of plastic waste used in packaging (Akintoye et al., 2022; Chueamuangphan et al., 2019). The environmental impact of products, packaging, and delivery systems has become increasingly significant for e-commerce, making it necessary to develop and implement sustainability policies that communicate this information to consumers (D'Adamo et al., 2021). Therefore, companies need to enhance consumer experience and protect their brand image through packaging functionality and aesthetic presentation. In addition, they should seek to address the direct and indirect environmental impacts of packaging via green slogans (Escursell et al., 2021).

3. Methodology

This study's approach is based on multi-criteria decision-making techniques illustrated in Fig.1. In the first step, the sustainable development indicators in the context of e-commerce are finalized through the literature review, Delphi method and discussing between experts. Six experts who were experienced in big data analytics focused on e-commerce contributed to complete this part. Before ranking big data applications based on sustainable development indicators it is necessary to calculate the weight of each criterion. The best worst method (BWM) is used in this step since it requires fewer pairwise comparisons and produces more consistent results than other multi-criteria decision-making techniques (Ahmadi et al., 2017). Finally, for ranking the big data applications the Fuzzy Topsis is applied which is widely used in various domains to prioritize alternatives (Solangi et al., 2021).

4. Numerical Findings

This section explains the numerical findings of prioritizing big data applications in e-commerce considering sustainable development indicators. In the first part of this section, the weights of the main sustainable development pillars and sub indicators of big data analytics in e-commerce are obtained. In the second part the weights of applications are calculated and finally sensitivity analysis is presented.

4.1 Calculation of sustainable development indicators

A pairwise comparison questionnaire based on a 1-9 rating was developed by six experts in big data analytics and e-commerce to compare the main sustainable development pillar and each sub-indicator. Experts select the best and the worst criterion for the main SDI and the sub-SDI, and then express the preference of the best criterion over all the other criteria and the preference of all the other criteria over the worst by rating between 1 and 9. Table 2 shows the final average of weights for the main SDI and sub-SD consistency ratios. Based on the calculated consistency values, pairwise comparisons are shown to be relatively consistent.

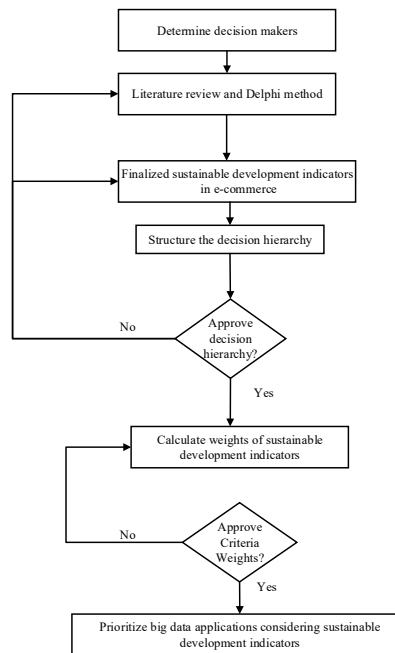


Fig.1. Overview of steps to prioritize big data applications considering SD indicators

Table 2
Weights of Main SDI and sub-SDI

Main SDI	Weights of Main SDI	Main CR	Sub-SDI	Weights of Sub-SDI	Sub-CR	Global weights	Ranking
Economic	0.111	0.063	Ec1	0.183	0.057	0.020	11
			Ec2	0.623		0.069	7
			Ec3	0.194		0.021	10
Environmental	0.512		En1	0.157	0.049	0.081	5
			En2	0.251		0.129	3
			En3	0.148		0.076	6
			En4	0.444		0.227	1
Social	0.377		S1	0.182	0.044	0.069	8
			S2	0.245		0.092	4
			S3	0.413		0.156	2
			S4	0.160		0.060	9

4.2 Prioritizing big data applications

After calculating the weights of all main and sub indicators of sustainable development in e-commerce, the next step is to rank big data applications in e-commerce. Fuzzy TOPSIS methodology ranks big data applications according to sustainable development indicators. The experts discussed using linguistic scale to rate big data applications. The final ranking of big data applications in e-commerce considering sustainable development indicators is presented in Table 3.

Table 3
Final rankings of big data applications considering sustainable development indicators

Big data Applications		D+	D-	CC	Ranking
Analyse and extract customer need	A1	28.639	0.785	0.027	6
Coordinate and monitor supply chain process	A2	27.913	0.924	0.032	1
Create new product and service	A3	28.272	0.86	0.03	3
Customer experience	A4	28.894	0.743	0.025	8
Customer segmentation	A5	29.701	0.608	0.02	9
Customized advertisement	A6	31.22	0.368	0.012	16
Customized marketing promotion	A7	30.834	0.428	0.014	14
Demand forecasting	A8	29.965	0.574	0.019	11
Detect fake and deceptive review	A9	31.967	0.222	0.007	23
Dynamic pricing	A10	31.7	0.269	0.008	21
Financial fraud detection	A11	31.562	0.284	0.009	20
Innovate product, process and business model	A12	28.094	0.881	0.03	2
Inventory management	A13	30.49	0.466	0.015	12
Market basket analysis	A14	30.751	0.438	0.014	13
Online customer review analytics	A15	28.501	0.827	0.028	5
Predict the next to buy	A16	31.687	0.263	0.008	22
Product categorization	A17	31.657	0.287	0.009	19
Recommend personalized service	A18	28.754	0.769	0.026	7
Redesign and improve product feature	A19	28.257	0.858	0.029	4
Revenue management	A20	29.781	0.604	0.02	10
Risk management	A21	31.117	0.371	0.012	15
Service and product sales analytics	A22	31.457	0.308	0.01	18
Social network analysis	A23	31.562	0.317	0.01	17

4.3 Sensitivity analysis

To check the model's robustness and eliminate biases, we use sensitivity analysis. In order to execute sensitivity analysis, the weight of environmental that got highest weight is varied from 0.1 (Run1) to 0.9 (Run 9) and subsequently, weights of two other main sustainable development indicators are varied. Nine runs were performed in sensitivity analysis. Table 4 shows the weights of social and economic indicator barriers when the weight of environment is changed. Next step is to use these main indicators weights to calculate global weights of sub-indicators of sustainable development and these global weights are used in Fuzzy TOPSIS methodology again for nine different runs to calculate new ranking of solutions in different conditions. Table 5 presents the results. Table 5 and Fig. 2 shows that ranking of the big data applications considering sustainable development indicators doesn't vary much even after varying the weights of main indicators. Hence the results are free from bias and the proposed model is robust.

Table 4
Variation in weights value for the main SDI environment weight value

DSI	Norm	Run1	Run2	Run3	Run4	Run5	Run6	Run7	Run8	Run9
Environmental	0.512	0.100	0.200	0.300	0.400	0.500	0.600	0.700	0.800	0.900
Economic	0.111	0.204	0.181	0.159	0.136	0.113	0.091	0.068	0.045	0.023
Social	0.377	0.696	0.619	0.541	0.464	0.387	0.309	0.232	0.155	0.077

Table 4
Ranking of applications during sensitivity analysis when weight of main SDI varies from 0.1 to 0.9.

App	Norm	Run1	Run2	Run3	Run4	Run5	Run6	Run7	Run8	Run9
A1	6	7	7	6	6	6	6	6	6	6
A2	1	2	2	1	1	1	1	1	1	1
A3	3	6	3	3	3	2	2	2	2	2
A4	8	5	6	7	8	8	8	8	8	8
A5	9	9	9	9	9	9	9	9	9	9
A6	16	15	15	15	15	16	21	21	21	21
A7	14	14	14	14	14	14	13	13	13	15
A8	11	11	11	11	11	11	11	11	11	11
A9	23	21	22	23	23	23	22	22	22	22
A10	21	20	20	20	19	19	16	16	16	14
A11	20	22	21	21	20	20	15	15	15	12
A12	2	1	1	2	2	3	3	3	3	4
A13	12	12	12	12	12	12	12	12	12	13
A14	13	13	13	13	13	13	14	14	14	17
A15	5	3	5	5	5	5	5	5	5	5
A16	22	23	23	22	21	21	17	17	17	16
A17	19	19	19	19	22	22	23	23	23	23
A18	7	8	8	8	7	7	7	7	7	7
A19	4	4	4	4	4	4	4	4	4	3
A20	10	10	10	10	10	10	10	10	10	10
A21	15	17	17	17	17	17	20	20	20	20
A22	18	18	18	18	18	18	19	18	18	18
A23	17	16	16	16	16	15	18	19	19	19

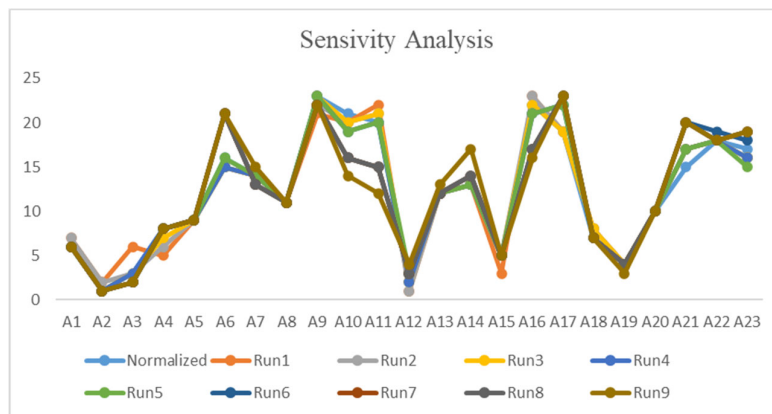


Fig. 2. Results of sensitivity analysis for solutions.

5. Discussion and Conclusion

The weights of main sustainable development indicators and sub-indicators are calculated through BWM. The results indicate that environmental sustainability obtained the highest weight of 0.512 among the three major pillars. E-commerce's rapid growth has had a profound impact on sustainability's environmental dimension (D'Adamo et al., 2021). Although sustainable e-commerce can't be achieved by maximizing the goal of just one pillar without considering the impact on others, there are strong evidences to suggest that the development of sustainability as a whole is positively correlated with sustainability of the environment (Barbier, 2017; Sun et al., 2021; Zhao et al., 2020)

The energy consumption efficiency indicator with a global weight of 0.227 ranks first among the sub-indicators. In addition, customer awareness and reusable packaging and product recyclability are ranked as the second and third indicators. Shipping and packaging waste increased as physical stores closed during the pandemic and e-commerce grew (D'Adamo et al., 2021). This growth of e-commerce has led to an increase in customer orders, which may have negative environmental consequences in terms of increased CO2 emissions and energy consumption (Arnold et al., 2018; Escursell et al., 2021). It is also important for customers that companies take into account social values, environmental protection, and relationships with various stakeholders in strategic planning. Incorporated social responsibility considers not only social responsibility, but also financial and social indicators (Saura et al., 2017). Recently, consumers had increasingly supported companies that

operate responsibly toward the environment, especially among the younger generation. Social media has played a significant role in this trend (D'Adamo et al., 2021). The green e-commerce project demonstrated simple techniques that can be used by small businesses to reduce energy consumption and waste production, mitigate climate change, and promote environmental sustainability (Arora, 2021). According to a recent study, 65% of consumers say they want to buy products that support environmental sustainability. This underscores the importance of sustainability to customers (Rao et al., 2021).

After calculating the weights of sustainable development indicators, the ranks of big data applications are obtained. As shown in table 3, coordinating and monitoring supply chain processes, innovating product, process and business models, and creating new products and services are the top three applications of big data in e-commerce with respect to sustainable development indicators. The three aspects of sustainable development are fully interconnected to achieve short-term and long-term benefits and e-commerce should focus on multi-faceted approach that incorporates social, environmental, and economic aspects (Chen, 2015; Mensah, 2019; Oláh et al., 2019). Since these top applications of big data involve the whole e-commerce process, retailers, departments, and customers, they would benefit sustainable e-commerce by considering all aspects rather than focusing on isolated initiatives.

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