

Navigating Sustainable Practices in E-commerce: A Systematic Literature Review with Insights from the ADO Framework

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ABSTRACT

Purpose: *The convergence of e-commerce and sustainability sparks an investigation into their implications and approaches. Despite the efficiency promised by online shopping, apprehensions regarding packaging waste and energy use emphasize the necessity for detailed scrutiny of the environmental impact of e-commerce and its contribution to sustainable consumption in the ever-evolving global market.*

Design/Methodology/Approach: *This research paper aims to investigate the connection between sustainability and e-commerce, employing the (ADO) i.e. Adoption, Diffusion, and Optimization (ADO) framework to analyse antecedents, decisions, and outcomes. The research explores theoretical foundations, such as Industrial Ecology, B2C business models, and the Resource-Advantage Theory, to reveal the multifaceted relationship between e-commerce and sustainability. Strategic decisions, varying from impacts on energy consumption to the integration of sustainable practices in e-commerce, are studied, shedding light on the multifaceted landscape of e-commerce sustainability. Determinate outcomes, including enhanced sustainability factors, positive impacts on commitment and e-word of mouth, and noteworthy contributions to UN Sustainable Development Goals, emphasize the transformative potential of e-commerce.*

Findings/Result: *The study assessment emphasizes for the continued integration of sustainability into e-commerce strategies, urging all stakeholders to navigate complexities and adopt eco-friendly practices for a better sustainable digital future. The discussion synthesizes diverse perspectives, highlighting the dynamic nature of e-commerce and its capacity to positively influence societal and environmental objectives.*

Originality Value: *The paper has used ADO approach which ensures the novelty of the research for the topic under study.*

Paper Type: *Research paper*

Keywords: E-commerce, Sustainability, ADO Framework, Sustainable Consumption

1. INTRODUCTION :

E-commerce's fusion with sustainability prompts exploration into its impact and strategies. While digital shopping promises efficiency, concerns about packaging waste and energy consumption underscore the need for a nuanced examination of e-commerce's environmental footprint and its role in sustainable consumption within the dynamic global marketplace.

1.1 Introduction to E-commerce and Sustainability:

In the contemporary landscape of global commerce, the intersection between e-commerce and sustainability has become a focal point of inquiry and action. E-commerce, fuelled by technological advancements, has transformed the way businesses operate and consumers engage in transactions. Simultaneously, heightened awareness of environmental and social issues has propelled the discourse on sustainable consumption practices. This dynamic interplay between e-commerce and sustainability raises crucial questions: How do e-commerce practices impact sustainability, and what strategies can

be employed to navigate the intricate landscape of sustainable practices within the digital marketplace? [1].

As the world increasingly relies on digital platforms for shopping, the environmental footprint of e-commerce activities becomes a subject of critical importance. Some argue that the efficiency and resource optimization associated with online transactions inherently make e-commerce a more sustainable alternative to traditional retail. However, divergent perspectives challenge this notion, highlighting concerns about packaging waste, energy consumption, and the broader ecological implications of the digital economy. This dichotomy underscores the need for a comprehensive examination of sustainable practices in the realm of e-commerce [2].

1.2 The Emergence of Sustainable Consumption in E-commerce:

The evolution of sustainable consumption practices within e-commerce requires a nuanced understanding of the strategies employed by businesses operating in the digital sphere. As consumers increasingly prioritize environmentally conscious choices, companies are compelled to integrate sustainability into their core strategies. The quest for sustainable e-commerce practices extends beyond mere environmental considerations, encompassing social and economic dimensions as well. From ethical sourcing of products to fair labour practices within the supply chain, the landscape of sustainable consumption in e-commerce is multifaceted [3].

In this context, the ADO (Adoption, Diffusion, and Optimization) framework emerges as a valuable analytical tool for evaluating and guiding sustainable practices in e-commerce. This framework systematically examines the adoption of technologies, their diffusion across the industry, and the optimization of these technologies to enhance overall performance. Applying the ADO framework to the exploration of sustainable practices in e-commerce offers a structured approach to unravelling the complexities and interdependencies involved in achieving sustainability goals [4].

1.3 Purpose and Scope of the Systematic Literature Review:

This systematic literature review aims to provide a comprehensive understanding of sustainable practices in e-commerce through the lens of the ADO framework. By synthesizing existing knowledge, identifying gaps in current research, and offering insights into potential areas of improvement, this study seeks to contribute to both academia and industry. Through a rigorous analysis of scholarly works, the review intends to navigate the current landscape of sustainable consumption in e-commerce, shedding light on successful strategies, challenges, and opportunities for further research and implementation [5].

2. RESEARCH OBJECTIVES :

- (1) To examine factors impacting environmental sustainability of E Commerce.
- (2) To investigate the variables impacting online shopping behaviour.
- (3) To identify the benefits of E Commerce for consumers and environment.

3. RESEARCH METHODOLOGY :

Framework: This SLR adopts the ADO framework, which stands for Antecedents, Decisions, and Outcomes. This structured approach allows us to systematically analyse the factors influencing decision-making in e-commerce contexts, focusing on sustainable choices.

Literature Search: The author has conducted a comprehensive search for peer-reviewed academic articles, conference proceedings, and relevant reports, and published documents from Google Scholar which is a popular free database. Authors usually prefer Google Scholar as the interface is user-friendly and it catalogues quality publications ranging from journal papers, conference proceedings, book chapters and likewise. This makes the database preferred by authors as it covers both widely recognized and lesser popular publications.

Inclusion Criteria: The study has been strictly based on the inclusion of papers published in only Journals. Secondly, papers are included based on their relevance to the research topic. The authors have thoroughly examined the Title, abstract, and entire documents to find the relevancy with the topic under study. Hence the search gets narrowed down to 15 documents published and are available on Google Scholar.

Table 1: ADO framework

S. No.	Antecedents	Decisions	Outcomes	References
1	Theoretical framework: Industrial ecology, Empirical dynamic models (EDMs)	Impact of e-commerce on energy consumption in the commercial, industrial, residential, and transportation sectors	E-commerce boosts energy use in homes and businesses, and its impact gets stronger as online shopping grows, especially for stores and deliveries.	Dost & Maier (2018). [6]
2	Sustainability dimensions in B2C business models	The primary outcome measured in the study is the impact of trust, innovation, usefulness, concentrated product category, and customer support service on commitment, which in turn influences eWOM and sustainable consumption	Sustainable online shopping dimensions have a significantly positive impact on commitment, which in turn influences eWOM and sustainable consumption.	Bhat et al. (2020). [7]
3	The theoretical framework in is based on the relationship between e-commerce and sustainability of business organizations,	Predominantly medium to high positive effect of e-commerce on twenty sustainability factors belonging to environmental, economic, social, and general domains.	The study reveals a widespread belief in the positive impact of e-commerce on sustainability. It shows a medium to high positive effect on twenty sustainability factors, and there's a strong positive connection among most of these factors.	Chaudhary (2016). [8]
4	The paper is based on the theoretical frameworks related to environmental impacts and consumer behavior in the context of e-commerce.	Behavioral intention to use e-commerce channels, influenced by green consumerism, positive and negative environmental attitudes, perceived ease of use, and perceived usefulness	Introduction of perceived ease of use and perceived usefulness constructs led consumers to prefer ease of use and usefulness of e-commerce over positive environmental factors.	Rao et al. (2021). [9]
5	Independent variables tested were : e-loyalty, trust, satisfaction, website accessibility	The research identifies e-loyalty antecedents, highlighting both direct and mediated effects of satisfaction on e-loyalty. It explores the interconnection between developed and developing countries due to online commerce exchanges.	The study reveals that website accessibility directly impacts e-loyalty, satisfaction, and trust. It also influences satisfaction-mediated trust and loyalty toward the online store's website.	Paștiu et al. (2020). [10]
6	The theoretical framework is the Resource-	The main outcomes measured in the study are the environmental effects	ICT capital proportion influences sustainable effectiveness; e-	Popescu (2015). [11]

	Advantage Theory and the concept of sustainability DNA.	of e-commerce, competitive superiority provided by a marketing scheme that assimilates sustainability, sustainable effectiveness, sustainability inferences of e-business resolutions, and e-commerce impacts on social sustainability.	commerce evolves as a strategic management tool, and ICT has a positive impact on reducing greenhouse gas emissions in energy-intensive economies.	
7	Dependent variables including basket size, transport mode, trip length, frequency, travel behaviour, e-fulfillment choice, van delivery routing	Environmental impact of online retailing, framework for assessing environmental factors, environmental sustainability of e-commerce, ways to make e-commerce more environmentally sustainable	Consumer shopping behaviour significantly impacts the environmental sustainability of e-commerce, and encouraging consumers to consolidate their shopping trips and maximize delivery items can improve sustainability.	Van Loon et al. (2015). [12]
8	The theoretical framework is based on the three pillars model and the Triple Bottom Line concept, which emphasize the interconnectedness and interdependence of ecological, social, and economic sustainability.	This study seeks to understand both the "what" and "why" of Chinese online shopping. It asks what platforms consumers choose and how often, what influences purchase decisions on specific platforms, and how purchase intent evolves into long-term platform loyalty.	Factors like product variety, site design, company image, order fulfillment, delivery process, trust in recommendations, and platform awareness play a significant role in shaping e-commerce platform preferences.	Kennedy et al. (2022). [13]
9	The dependent variables used are the achievement of sustainable development goals through e-commerce	The study aims to determine the possible contribution of e-commerce to the achievement of sustainable development goals and to determine the positive or negative impact of e-commerce.	The main findings of the study indicate that e-commerce is linked to 10 of the 17 UN Sustainable Development Goals, with mostly positive effects. The contribution of e-commerce to achieving sustainable development goals is relatively high, as it can help achieve 10 of the 17 SDGs.	Revinova (2021). [14]
10	Independent variables include the paradigm shift in Indian consumer's preferences, the role	The study comprehended customer responses to shifts in preferences, assess e-commerce potential, examine the fusion of e-	E-commerce provides a sustainable business future for companies over conventional business practices,	Sur (2018). [15]

	of e-commerce in sustainable business, online platforms raising awareness, integration of e-commerce strategies with sustainable development principles	commerce strategies with sustainable development principles, and identified factors impacting consumer choices tied to sustainable development.	helps enhance awareness of offerings, and explores the integration of e-commerce strategies and sustainable development principles for the success of companies.	
11	The theoretical framework is based on concepts related to freight transport and logistics restructuring, energy use in personal transports, and behavior change towards sustainable modes of transport.	The main or primary outcome measured in the study is the effects of e-shopping on behavioral changes, travel patterns, sustainability gains, and potential impacts resulting from changes of indicators.	E-commerce transforms trade, influencing logistics and sustainability in both rural and urban areas. In Sweden, it offers potential energy savings by changing shopping behavior. The sustainability impact depends on how consumers use the time and resources saved through e-shopping.	Hiselius et al. (2012). [16]
12	The dependent variable in the study is the economic benefit received by consumers when buying commodities online using e-commerce technologies.	Economic benefit of using e-commerce technologies by consumers	The study proposes an economic profile favoring e-commerce adoption, introducing a cash-flow model indicating cost efficiency. Despite lower consumer expenditure, expenses increase with internet access and goods delivery maintenance, impacting overall economic benefits.	Burinskienė & Burinskas (2012). [17]
13	The theoretical framework is the unified information system-consumer behaviour (IS-CB) model for online shopping.	Well-designed websites produce higher levels of trust and reduced website irritation among online customers.	PV and trust in online shopping are key for positive attitudes and shopping intentions, filling gaps in previous research, and proposing a unified model for sustainable e-business.	Ijaz & Rhee (2018). [18]
14	The independent variables: Sellers' tech play: mobile shopping, digital payments, online marketing, inventory control,	To understand the dynamic changes in E-commerce in the near future and to integrate.	India's digital boom fuels E-commerce, while smart seller tech and sustainability demands reshape the shopping landscape.	Vaidya (2020). [19]

	and data automation.			
15	Sustainable logistics, green packaging, recycled products, and carbon emissions reduction.	Environmental implications of e-commerce and its relationship with sustainability	Debates persist on the environmental friendliness of e-commerce compared to traditional retail, emphasizing the need for companies to navigate trade-offs across multiple dimensions to achieve sustainability.	Sarkar, M. (2023). [20]

4. ANTECEDENTS :

Examining the antecedents of sustainability within the context of e-commerce reveals a diverse array of theoretical frameworks. First, the exploration of Industrial Ecology and Empirical Dynamic Models (EDMs) serves as a foundational theoretical framework, shedding light on the intricate relationship between e-commerce and energy consumption in various sectors [6]. Second, sustainability dimensions in Business-to-Consumer (B2C) business models form another critical antecedent, as the study investigates the impact of trust, innovation, usefulness, concentrated product category, and customer support service on commitment, thereby influencing eWOM and sustainable consumption [7]. Additionally, a theoretical foundation centered on the relationship between e-commerce and the sustainability of business organizations is established, providing insights into the medium to high positive effects of e-commerce on twenty sustainability factors across environmental, economic, social, and general domains [8]. Furthermore, antecedents related to environmental impacts and consumer behaviour in the context of e-commerce are explored, revealing key considerations for understanding the behavioural intention influenced by green consumerism and the factors influencing e-loyalty, trust, satisfaction, and website accessibility [9, 10].

The Resource-Advantage Theory and the sustainability DNA concept contribute significantly to the antecedents of sustainable practices in e-commerce [11]. This theoretical framework guides the investigation into the environmental effects of e-commerce, competitive superiority through sustainability integration, sustainable effectiveness, and the implications of e-commerce on social sustainability [11]. The antecedents also extend to considerations of consumer shopping behaviour, with dependent variables including basket size, transport mode, trip length, frequency, travel behaviour, e-fulfilment choice, and van delivery routing, illustrating the complex web of factors influencing the environmental sustainability of e-commerce [12]. Moreover, a theoretical foundation based on the Three Pillars Model and the Triple Bottom Line concept accentuates the interconnectedness and interdependence of ecological, social, and economic sustainability, influencing Chinese online shopping preferences [13].

Antecedents further branch into exploring the achievement of sustainable development goals through e-commerce, identifying the positive effects of e-commerce on 10 out of the 17 UN Sustainable Development Goals [14]. The paradigm shifts in Indian consumer preferences, the role of e-commerce in sustainable business, and the integration of e-commerce strategies with sustainable development principles represent additional antecedents, highlighting the evolving landscape of consumer behaviour and business strategies in the Indian context [15]. Antecedents are also uncovered in the examination of concepts related to freight transport, logistics restructuring, energy use in personal transports, and behaviour change towards sustainable modes of transport [16]. The economic benefit received by consumers when buying commodities online using e-commerce technologies is another critical antecedent, emphasizing the need to understand the economic implications of e-commerce transactions [17].

Further, the unified information system-consumer behaviour (IS-CB) model serves as a theoretical framework, revealing antecedents related to well-designed websites, trust, and reduced website

irritation among online customers [18]. Independent variables related to sellers' tech play, encompassing mobile shopping, digital payments, online marketing, inventory control, and data automation, contribute as antecedents shaping the technological landscape of e-commerce [19]. Lastly, antecedents extend to the exploration of sustainable logistics, green packaging, recycled products, and carbon emissions reduction, underlining the imperative for environmentally conscious practices within e-commerce operations [20].

5. DECISIONS :

Decisions in the realm of sustainability and e-commerce encompass a multitude of considerations. The decision-making process initiates with a focus on understanding the impact of e-commerce on energy consumption across commercial, industrial, residential, and transportation sectors, exploring the intricacies of its environmental footprint [6]. Moving to the consumer-centric sphere, the primary decision revolves around measuring the impact of trust, innovation, usefulness, product category concentration, and customer support service on commitment. This commitment, in turn, influences eWOM and sustainable consumption patterns, emphasizing the pivotal role of consumer trust and experience in shaping sustainable behaviours [7].

Another critical decision-making juncture involves acknowledging the predominantly medium to high positive effect of e-commerce on twenty sustainability factors spanning environmental, economic, social, and general domains. This decision provides a comprehensive overview of the broad-reaching implications of e-commerce on various dimensions of sustainability [8]. Further delving into consumer behaviour, the decision to understand the behavioural intention to use e-commerce channels emerges. This decision is shaped by factors such as green consumerism, positive and negative environmental attitudes, perceived ease of use, and perceived usefulness, reflecting the multifaceted nature of consumer choices in the digital marketplace [9].

In the global context of e-commerce, a decision is made to identify e-loyalty antecedents, highlighting the interconnectedness between developed and developing countries through online commerce exchanges. This decision sheds light on the factors influencing consumer loyalty in the evolving landscape of international e-commerce transactions [10]. Shifting focus to broader sustainability outcomes, a pivotal decision involves measuring the environmental effects of e-commerce, exploring competitive superiority through sustainability-integrated marketing schemes, and assessing the sustainable effectiveness and inferences of e-business resolutions. Additionally, the decision-making process encompasses understanding the social sustainability implications of e-commerce, showcasing a holistic approach to sustainability assessment [11].

Environmental considerations take centre stage in the decision to assess the impact of online retailing, develop frameworks for evaluating environmental factors, ensure the environmental sustainability of e-commerce, and explore avenues to enhance its eco-friendliness [12]. Chinese online shopping patterns become a focal point, and decisions are made to understand platform choices, purchase influences, and the evolution of purchase intent into long-term platform loyalty, offering insights into the dynamics of the world's largest e-commerce market [13].

The pursuit of sustainable development goals becomes a strategic decision, aiming to determine the potential contribution of e-commerce while critically evaluating its positive or negative impact [14]. The decision-making process extends to comprehending customer responses, assessing e-commerce potential, examining the fusion of e-commerce strategies with sustainable development principles, and identifying factors shaping consumer choices aligned with sustainable development objectives [15].

Economic benefits derived by consumers through the utilization of e-commerce technologies become a pivotal decision point, highlighting the financial aspects of digital transactions [16]. Website design takes precedence as a decision, recognizing that well-designed websites produce higher levels of trust and reduced irritation among online customers, emphasizing the importance of user experience in online interactions [16, 17].

The overarching decision-making process concludes with a focus on understanding dynamic changes in e-commerce, aiming to integrate evolving trends in the near future [18,19]. Lastly, decisions addressing the environmental implications of e-commerce and its relationship with sustainability are made, underscoring the need for a comprehensive understanding of the environmental footprint of digital commerce [20].

6. OUTCOMES :

The outcomes of these studies collectively contribute to a nuanced understanding of the interplay between e-commerce and sustainability [6]. Study reveals that as online shopping grows, especially for stores and deliveries, e-commerce significantly boosts energy use in homes and businesses. Research study [7] establishes that sustainable online shopping dimensions have a significantly positive impact on commitment, influencing eWOM and sustainable consumption. Finding [8] indicates a widespread belief in the positive impact of e-commerce on sustainability, with a medium to high positive effect on twenty sustainability factors. A study highlights that introducing perceived ease of use and perceived usefulness constructs in e-commerce leads consumers to prefer convenience and usefulness over positive environmental factors [9]. A recent study [10] demonstrates that website accessibility directly impacts e-loyalty, satisfaction, and trust, influencing loyalty toward online stores. A research outcome underscores the positive influence of ICT capital proportion on sustainable effectiveness and the role of e-commerce in reducing greenhouse gas emissions [11]. Findings suggest that consumer shopping behaviour significantly impacts the environmental sustainability of e-commerce, and encouraging consolidation of shopping trips can improve sustainability [12]. The study reveals that factors like product variety, site design, and trust play a significant role in shaping e-commerce platform preferences among Chinese consumers [13-16]. Another analysis finds that e-commerce is linked to 10 of the 17 UN Sustainable Development Goals, contributing significantly to achieving sustainability targets [17-19]. Studies collectively emphasize that e-commerce provides a sustainable business future, enhances awareness, reshapes the shopping landscape, and requires companies to navigate trade-offs across multiple dimensions to achieve sustainability [20].

7. DISCUSSION :

The examination of sustainability and e-commerce unfolds a diverse spectrum of theoretical frameworks, strategic decisions, and measurable outcomes. Theoretical foundations, like Industrial Ecology and B2C models, shed light on the intricate relationship between e-commerce and sustainability. The Resource-Advantage Theory and sustainability DNA contribute significantly, guiding investigations into environmental effects, competitive superiority, and social sustainability implications. Antecedents extend to considerations of consumer behaviour, environmental impact, and the interconnectedness of ecological, social, and economic sustainability [21]. Moreover, strategic decisions reveal a multifaceted landscape, encompassing impacts on energy consumption, consumer trust, and the broader sustainability spectrum. The outcomes collectively underscore the transformative potential of e-commerce. Positive impacts include boosted energy use, enhanced sustainability factors, and significant contributions to achieving UN Sustainable Development Goals. Consumer-centric outcomes highlight the positive influence on commitment, eWOM, and sustainable consumption. Environmental considerations lead to decisions that encourage eco-friendly practices in online retailing, emphasizing the need for a holistic understanding of the environmental footprint associated with digital commerce [22-23]. Overall, the outcomes align with the evolving nature of e-commerce, emphasizing its potential to contribute positively to societal and environmental objectives.

8. CONCLUSION :

In conclusion, the exploration of sustainability in the context of e-commerce unveils a dynamic landscape shaped by diverse theoretical frameworks, strategic decisions, and impactful outcomes. The interplay between antecedents and decisions emphasizes the intricate relationship between e-commerce and sustainability factors. The positive outcomes underscore the potential of e-commerce to not only enhance business efficiency but also contribute meaningfully to environmental and societal goals. As e-commerce continues to evolve, stakeholders are urged to navigate complexities, integrate sustainability into strategic decisions, and adopt eco-friendly practices for a more sustainable digital future.

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