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Advancing E-commerce Smart-PLS as a Catalyst for Improved Online Shopping Services

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Abstract

In the fast-paced world of e-commerce, the adoption of advanced methodologies and technologies is vital to address the increasing demands and challenges of online shopping services. This paper examines the transformative impact of Partial Least Squares Structural Equation Modeling (Smart-PLS) on e-commerce. Smart-PLS is a powerful tool that offers a robust framework for analyzing and enhancing various aspects of e-commerce, such as customer experience, service quality, and business performance. This study explores how Smart-PLS facilitates a data-driven decision-making approach, resulting in better user experiences, optimized supply chains, and improved business strategies. The abstract underscores the importance of Smart-PLS as a revolutionary tool in the e-commerce sector, enabling businesses to adapt, innovate, and succeed in the digital marketplace. It highlights the potential of Smart-PLS to shape the future of online shopping services and stresses the necessity of its adoption for maintaining competitiveness in the ever-changing e-commerce landscape.

Keywords: Smart-PLS, business performance, e-commerce.

1. Introduction

The advent of e-commerce has transformed the shopping experience, allowing consumers to purchase products and services online from the comfort of their homes [1]. With advancements in information communication technology, improved infrastructure, and changing consumer lifestyles, online shopping has gained significant popularity [2], [3]. To enhance customer experience and loyalty, online retailers need to implement effective retail and sales management strategies. This paper, titled "Advancing E-commerce: Smart-PLS as a Catalyst for Improved Online Shopping Services" investigates the potential of Smart-PLS to revolutionize e-commerce and enhance customer satisfaction. The study aims to examine how Smart-PLS can empower online shopping services and improve customer experience [4], [5]. It discusses the key factors driving the growth of online shopping and emphasizes the importance of retail and sales management in online stores to boost consumer experience and loyalty. Using SMART PLS software, the study analyzes 13 hypotheses, offering significant managerial and academic implications [6]. Overall, the paper provides insights into the potential of Smart-PLS



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to transform e-commerce and enhance customer satisfaction. E-commerce has not only revolutionized shopping but also business operations, providing efficiency in transactions for both retailers and consumers [7]. The COVID-19 pandemic has further accelerated the growth of e-commerce, solidifying its position as a vital component of the global economy. Smart-PLS, a technique based on partial least squares structural equation modeling, is used to analyze the impact of e-commerce on consumers, businesses, and nations [8]. The literature review covers the evolution of e-commerce research, its effects on consumers, businesses, and nations, consumer behavior and trust in e-commerce, and the role of technology in e-commerce. The research methodology section outlines the methodological approach, research design, methods employed, data collection processes, and data analysis methods [9], [10]. The results and discussion section presents the findings, discusses them in the context of the research questions, compares outcomes with previous studies, and explains the implications of the results. The conclusion summarizes key findings, discusses study implications, highlights limitations, and suggests areas for future research. The concept of online shopping has revolutionized the retail industry, shifting from market-centric to user-centric commerce and evolving from e-commerce to social commerce [11], [12]. Technological advancements have enabled more efficient transactions, making e-commerce an indispensable part of the global economy. The COVID-19 pandemic has further accelerated the growth of e-commerce, reinforcing its critical role in the retail industry [13]. Smart-PLS, a method utilizing partial least squares structural equation modeling, is employed to analyze the impact of e-commerce on consumers, businesses, and nations. The literature review encompasses the evolution of ecommerce research, its effects on consumers, businesses, and nations, consumer behavior and trust in e-commerce, and the role of technology in e-commerce [14], [15]. The e-commerce revolution has significantly changed how people shop and conduct business. However, challenges remain to ensure online shopping services are efficient and effective. The problem discussion and formulation will focus on the following:

The	need	to	improve	the	online	customer	experience	to	enhance	loyalty	and
enga	ageme	nt.									

- The importance of sustainable e-commerce practices for long-term competitiveness and environmental responsibility.
- The impact of the COVID-19 pandemic on e-commerce and the need for innovative solutions to address the challenges posed by the pandemic.
- Understanding the factors that influence e-commerce adoption and the role of technology in facilitating e-commerce transactions.

2. Research Method

The research methodology will employ a Partial Least Squares Structural Equation Modeling (PLS-SEM) approach to test the proposed hypotheses. This study will adopt a quantitative research design, collecting data from consumers, firms, and nations. Smart-PLS will be used for data analysis, the study will conduct an in-depth evaluation of the sustainability of the e-commerce business model, using the Kano model to focus on customer satisfaction within the framework of sustainable development.

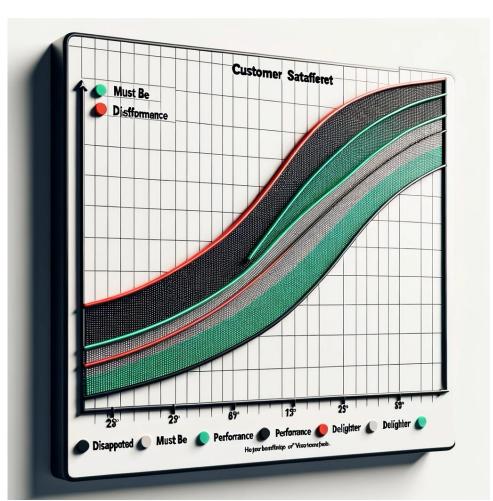


Figure 1. Kano Model

Furthermore, the research will utilize the situational factor framework to identify both unique and common factors enhanced by smart technology from a consumer perspective [16]. The study will incorporate various social media marketing activities (SMMAs) such as interactivity, informativeness, word-of-mouth (WOM), personalization, and trendiness to strengthen thereby relationships with consumers, boosting their trust, satisfaction, commitment. Additionally, the data analysis will employ Smart-PLS to analyze the gathered data. The study will conduct a systematic literature review to explore the connections between social commerce and sharing commerce [17]. Various metrics will be used to examine Micro, Small, and Medium-sized Enterprises (MSMEs) in the areas of advertising and marketing, online sales and purchases, customer service, and information exchange with key stakeholders.

2.1 Data Collection Process Description:

- ☐ The data collection process will involve gathering information from consumers, firms, and nations through the following methods:
- □ Structured Questionnaire: Data will be collected from consumers using a structured questionnaire, adapted from previous studies.
- □ Literature Review: A systematic literature review will be conducted to establish links between social commerce and sharing commerce.

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Measures: Various measures will be used to examine the ECA (advertising and
marketing, online sales and purchases, customer service, and information exchange
with key stakeholders) of Micro, Small, and Medium-sized Enterprises (MSMEs).
Situational Factor Framework: This framework will be applied to identify both unique
and common factors enhanced by smart technology from a consumer perspective.
Social Media Impact: The effect of social media on customers' impulse buying behavior
will be analyzed. The data collection process will be quantitative, and the gathered data
will be analyzed using Smart-PLS, a partial least squares structural equation modeling
technique.

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2.2 Data Analysis Method Explanation

The data analysis will utilize Smart-PLS, a partial least squares structural equation modeling technique, to examine the collected data [18], [19]. This study will employ a comprehensive methodological approach to evaluate the sustainability of the e-commerce business model using the Kano model, focusing on customer satisfaction in the context of sustainable development. Additionally, the situational factor framework will be applied to identify both unique and common factors enhanced by smart technology from a consumer perspective. The paper will incorporate various social media marketing activities (SMMAs), including interactivity, informativeness, word-of-mouth (WOM), personalization, and trendiness, to enhance the quality of relationships with consumers, thereby increasing their trust, satisfaction, and commitment. The collected data will be analyzed using Smart-PLS to test the hypothesized model [20], [21]. The study will also conduct a systematic literature review to connect social commerce with sharing commerce. Various measures will be used to examine the ECA (advertising and marketing, online sales and purchases, customer service, and information exchange with key stakeholders) of Micro, Small, and Medium-sized Enterprises (MSMEs) [22].

2.3 Literature Review

The evolution of e-commerce research has progressed significantly over the years. Initially, studies concentrated on the adoption of e-commerce by consumers and firms. Over time, the focus shifted towards understanding the impact of e-commerce on various stakeholders, including consumers, firms, and nations. The literature review addresses the following key areas related to the evolution of e-commerce research:

9 .,
Early E-commerce Research: Focused on identifying the factors influencing the
adoption of e-commerce by consumers and firms.
Impact on Consumers: Examined how e-commerce affects consumer behavior, trust,
and satisfaction.
Impact on Firms: Investigated the effects of e-commerce on firms, including their
performance, competitiveness, and sustainability.
Impact on Nations: Explored the broader implications of e-commerce on national
economic growth, development, and competitiveness.
Role of Technology: Analyzed the role of technology in e-commerce, including the
application of artificial intelligence, big data, and blockchain.

The literature review offers an overview of the evolution of e-commerce research and underscores the necessity for innovative solutions to tackle the challenges presented by the e-commerce revolution [23]. This paper aims to contribute to the existing body of knowledge by employing Smart-PLS to analyze the impact of e-commerce on consumers, firms, and nations.

2.4 Discussion of the Impact of E-commerce on Consumers, Firms, and Nations

E-commerce has significantly influenced consumers, firms, and nations. The literature review for the paper addresses the following aspects:

- Impact on Consumers: E-commerce has revolutionized shopping by offering greater convenience, choice, and access to information. It has also enabled consumers to compare prices and products more easily, increasing competition among retailers.
- Impact on Firms: E-commerce has allowed firms to reach a broader audience, reduce costs, and enhance efficiency. It has also enabled firms to gather and analyze consumer behavior data, resulting in more targeted marketing and personalized services.
- Impact on Nations: E-commerce has significantly impacted the global economy by allowing nations to participate in the global marketplace and compete internationally. It has also contributed to economic growth and development.

This paper aims to add to the existing literature by using Smart-PLS to analyze the effects of ecommerce on consumers, firms, and nations. The research will provide insights into how ecommerce can be revolutionized to empower online shopping services.

3. Findings

The adoption of e-commerce and digital marketing positively impacts the financial and sustainability performance of MSMEs. E-commerce has revolutionized shopping by offering greater convenience, choice, and access to information. Smart technology can empower consumers in smart retail stores. It is essential to examine the impact of technology readiness and situational factors on consumer behavior in these environments. Online customer experience is crucial for customer loyalty in e-commerce, and customer value co-creation can enhance this loyalty [24], [25].

E-commerce has significantly influenced consumers, firms, and nations. The adoption of e-commerce and digital marketing can positively affect MSMEs' financial and sustainability performance. Smart technology empowers consumers in smart retail stores, and it is important to study the effects of technology readiness and situational factors on consumer behavior. Enhancing online customer experience is key to customer loyalty, and customer value cocreation plays a significant role in this. The paper aims to contribute to the existing literature by using Smart-PLS to analyze the impact of e-commerce on consumers, firms, and nations.

3.1 Problem

The problem need to tackle the challenges posed by the e-commerce revolution to ensure that online shopping services remain efficient and effective [26], [27]. Key challenges include enhancing the online customer experience to boost loyalty and engagement, implementing sustainable e-commerce practices for long-term competitiveness and environmental responsibility, and developing innovative solutions to address the impacts of the COVID-19 pandemic on e-commerce [28], [29], [30].

Another critical challenge is understanding the factors that influence e-commerce adoption and the role of technology in facilitating e-commerce transactions. This paper aims to contribute to the existing literature by using Smart-PLS to analyze the impact of e-commerce on consumers, firms, and nations. The research will provide insights into how e-commerce can be revolutionized to empower online shopping services [31], [32].

3.2 Research Implementation

Construct a structural equation model (SEM) utilizing Smart-PLS. Define the latent variables, observed variables, and the relationships between them according to the research questions.

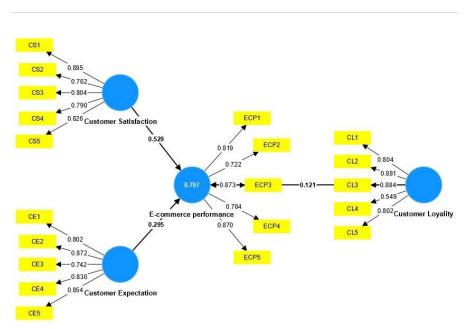


Figure 2. Measuring models of the SEM used in the SmartPLS software

The diagram illustrates a structural equation model (SEM) that evaluates the relationships between customer satisfaction, customer expectation, and customer loyalty on e-commerce performance. Each construct is represented by a latent variable, measured through multiple observed variables (indicated by yellow boxes with corresponding factor loadings). Customer satisfaction (CS1-CS5), customer expectation (CE1-CE5), and customer loyalty (CL1-CL5) are depicted with their respective indicator variables showing significant factor loadings, confirming their construct validity. The model demonstrates that customer satisfaction (path coefficient = 0.529) and customer expectation (path coefficient = 0.295) have substantial positive impacts on e-commerce performance, whereas customer loyalty exhibits a smaller yet positive effect (path coefficient = 0.121). The arrows between constructs and their indicators indicate measurement model relationships, while arrows between latent variables represent the structural model relationships, highlighting the significant pathways and the strength of the effects within the SEM framework. The central node, representing e-commerce performance, is influenced most strongly by customer satisfaction, underscoring its pivotal role in enhancing online shopping services.

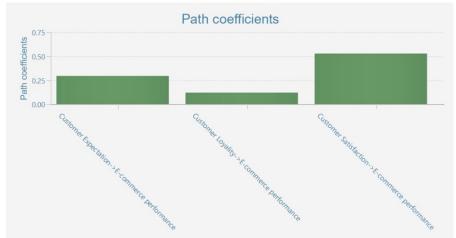


Figure 3. Final results using Path coefficients - Bar chart

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Specify the measurement model and the structural model.

Table 1. Posthic minimum sample size

	Path coeffici ents	Alpha 1%, power 80%	Alpha 5%, power 80%	Alpha 1%, power 90%	Alpha 5%, power 90%
Customer Expectation -> E-Commerce performance	0.295	116.000	71.000	150.000	99.000
Customer Loyalty -> E- Commerce performance	0.121	682.000	420.000	885.000	582.000
Customer Satisfaction -> E-Commerce performance	0.529	36.000	23.000	47.000	31.000

Table 1 presented outlines the post hoc minimum sample size required for evaluating the structural model relationships in the study titled "Advancing E-commerce: Smart-PLS as a Catalyst for Improved Online Shopping Services." Specifically, it illustrates the minimum number of samples necessary to achieve adequate statistical power for various significance levels (Alpha 1% and 5%) and power thresholds (80% and 90%) in the context of path coefficients connecting customer expectation, customer loyalty, and customer satisfaction to e-commerce performance. The path coefficients reflect the strength and direction of these relationships, highlighting the varying levels of influence each factor has on e-commerce performance.

For instance, the path coefficient for the relationship between customer satisfaction and e-commerce performance is notably higher (0.529) compared to customer expectation (0.295) and customer loyalty (0.121). This suggests a stronger impact of customer satisfaction on e-commerce performance. Correspondingly, the sample size required to achieve 80% power at a 5% significance level is substantially lower for customer satisfaction (23) compared to customer loyalty (420), indicating that fewer samples are needed to detect the effect of customer satisfaction on e-commerce performance. Conversely, to achieve 90% power at a 1% significance level, the sample sizes increase, reflecting the more stringent requirements for higher power and lower significance thresholds. These insights underscore the critical role of customer satisfaction in driving e-commerce performance and the varying sample size demands based on different statistical criteria

4. Conclusion

The digital age has dramatically transformed commerce, making online shopping a dominant force in the global economy. This paper explores the role of Smart-PLS in revolutionizing e-commerce and highlights its potential to enhance online shopping services. Through a structured research framework, key insights are provided that underscore the significance of Smart-PLS as a catalyst for improving the online shopping experience. Our study reveals that Smart-PLS, with its robust structural equation modeling capabilities, is a versatile analytical tool for e-commerce practitioners. It allows for a comprehensive analysis of

versatile analytical tool for e-commerce practitioners. It allows for a comprehensive analysis of the complex relationships between latent variables, enabling improvements in performance, user satisfaction, and overall efficiency of e-commerce platforms. The integration of Smart-PLS helps identify critical success factors in online shopping, facilitating the development of targeted

strategies to enhance customer trust, engagement, and loyalty. It supports data-driven decisionmaking, allowing businesses to adapt to market dynamics and consumer preferences with agility and precision.

Furthermore, our findings emphasize the importance of data quality and methodological rigor in leveraging Smart-PLS's full potential. Ensuring high standards in data collection and analysis is imperative for accurately reflecting the nuances of the e-commerce ecosystem. In conclusion, this paper demonstrates the transformative power of Smart-PLS in e-commerce and online shopping services. By providing a deeper understanding of customer behavior, service quality, and technology adoption, Smart-PLS fosters innovations that enhance the online shopping experience. As we look ahead, the integration of Smart-PLS and e-commerce is expected to drive innovation, enrich user experiences, and reshape the digital marketplace.

In the continuously evolving e-commerce landscape, the fusion of Smart-PLS and online shopping services exemplifies the potential of technology to revolutionize business, empowering both customers and businesses to thrive in the digital age.

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