



International Journal of Research Publication and Reviews

Journal Homepage: www.ijrpr.com ISSN 2582-7421

A Study on the Impact of E-Commerce Applications on Marketplace Efficiency in Buying and Selling

¹ Miss Taibatou A Jallow, ² Dr. Podile Venkateswararao

¹ Research scholar of BBA Department, KLEF, Vaddeswaram, E-Mail: tu2jallow@mail.com

² Guide: Professor, HOD, Department of BBA, KLEF, Vaddeswaram, India, E-Mail: vraopodile@kluniversity.in

ABSTRACT

The emergence of e-commerce applications has transformed the operations of businesses and the activities of the marketplace. E-commerce applications have changed the dynamics of buyer-seller interaction, eased transaction processes, and improved market accessibility, as well as operational efficiency. This study aims to set up the effect of e-commerce applications on the efficiency of the marketplace by evaluating the effect on factors including speed of transactions, reduced costs, provision of information, customer satisfaction, and market reach. Background information shows that e-commerce applications are in a position to reduce barriers to trade, improve information and communication, and boost overall productivity. To test the effect of e-commerce applications, a survey questionnaire was administered to 50 verified respondents, and 50 valid responses were obtained. Data collected from the survey were used to figure out the mean Overall Satisfaction and Marketplace Efficiency Index (comprising of market visibility, time saving, and cost reduction) of the sample survey and to establish relationships between the identified categories. Statistical tests performed on the dataset include a chi-square test, one-way ANOVA, and multiple linear regression analysis. Inferred relationships and their implications are discussed in Section 8.

In line with background information and supported by findings from the survey, the study concludes that the challenges experienced by the marketplace in the context of lack of trust, delivery delays, poor quality, unexpected additional costs, spotty internet connection, and poor customer support are moderated by the application of appropriate e-commerce applications. It is recommended that further studies explore the influence of these moderating effects shown in this study and the influence of a variety of factors on a buyer-seller platform. This study contributes to the body of knowledge on the efficacy of e-commerce applications in the marketplace by proving the benefits associated with improved factors and recommending areas of improvement.

Keywords: E-commerce, marketplace efficiency, buyer-seller trust, transaction cost, digital marketplace, survey research, regression analysis

1. Introduction

The rapid advancement of information and communication technology has been fundamental in transforming business operations. Electronic commerce (e-commerce) is a concept that involves the buying and selling of goods and services through online systems. E-commerce applications have been deployed globally with notable success, and these include Amazon, Alibaba, eBay, and mobile shopping apps. E-commerce presents many advantages to buyers, sellers, and the wider marketplace, including faster accessibility to goods and services, enhanced transparency, and improved communication.

Marketplace efficiency is a critical indicator of the performance of the marketplace as an entity where goods and services are exchanged for money with little or no waste in terms of time or resources. Traditional marketplaces have had limitations in achieving higher levels of efficiency due to several constraints, such as limited reach, lack of information, and high transaction costs. E-commerce platforms can help address these issues through better information exchange, provision of digital payment options, improved inventory management, and review systems. However, as technology continues to evolve, issues such as cybersecurity, digital divide, and market competition need to be addressed. There is a need to further understand the role of e-commerce applications in marketplace efficiency. This paper explores the effect of e-commerce applications in enhancing the efficiency of the marketplace, including boosting factors such as transaction speed, reducing costs such as delivery charges and time, enhancing overall customer satisfaction, and market reach. A survey will be conducted to collect data from 50 verified respondents. The study focuses on buyer-seller interactions and does not cover transaction information at the organisational level.

2. Literature Review

E-commerce has become a significant force in modern business, and experts worldwide have studied its implications. Researchers from Asia, Europe, and North America show e-commerce's critical role in economic growth, organisational success, and consumer satisfaction. Kramer, Gibbs, and Derrick (2002) conducted a first investigation into the impact of globalisation, e-commerce use, and firm performance in different countries, providing a solid foundation for later studies. Šaković Jovanović et al. (2020) analysed the influence of internet sales outlets on business. Rosário and Raimundo (2021)

reviewed the literature on e-commerce and marketing and found key areas of, online marketplaces' marketing resources, trust, information quality, and cost-effectiveness. Hwang (2024) focused on the factors affecting consumer's choices when shopping online, increase personalisation, trust, and convenience. The author notes that the COVID-19 pandemic has including significantly boosted online sales. Agyeman et al. (2022) highlighted the role of organisational platforms and business models in e-commerce development. UNCTAD reports (2023, 2024) note the rise of e-commerce worldwide. The value of online sales is projected to reach \$1 trillion in 2010 to \$6.5 trillion by 2023, with fears about the depletion of natural resources and the threat of such technologies as artificial intelligence and the Internet of Things to the environment growing daily. Otarinia (2024) discusses how developing countries can receive help from e-commerce and emphasises the need for comprehensive legislation for online sales. Farhat et al. (2025) examine trust, social influence, and perceived risk, while Bocean et al. (2025) explore the relationship between e-commerce, sustainability indicators, and economic growth, offering potential policies for businesses to adopt.

3. Research Gap

The earlier studies offer a considerable amount of information about factors influencing the adoption of e-commerce and its successful implementation. However, there is still some research gap, which can be addressed in future studies. While most of the research articles focus on developed countries, more empirical evidence and market analysis are needed in emerging economies. Moreover, there is a need to explore the adoption process in long-term studies, which would provide a more correct depiction of the development of e-commerce. Most of the earlier research articles also do not consider the impact of modern innovations, including artificial intelligence and blockchain technology. Finally, the specific challenges of small and medium-sized enterprises should also be considered, as well as the subtle nuances of socio-economic change.

Future Research Proposal: To address this research gap, future researchers should design a study that would explore how different technologies influence the use of e-commerce for purchase and sale;

4. Objective of the Study

To investigate the use of e-commerce for purchase and sale, its adoption level, and its impact on the implementation process;

To assess the current level of market adoption and find the major-factors influencing the decision to take part in digital commerce;

To decide the major factors influencing the level of trust, convenience, and security within digital marketplaces;

To find the major barriers to purchase and sale with the use of e-commerce; and

To develop a set of recommendations, which could be used to optimise future purchase and sale processes and make e-commerce more efficient.

5. Conceptual Framework

The conceptual framework for this study (Figure 1) posits e-commerce application features as an input, marketplace efficiency as a mediator, and buyer/seller outcomes as an output, with perceived issues as a context-dependent moderator that may weaken these relationships.

E-Commerce Application Features	Marketplace Efficiency	Outcomes
- Ease of use - Payment trust / security - Information quality - Reviews & feedback - Return/refund transparency	- Market reach - Time saving - Cost reduction - Transaction convenience	- Buying/selling satisfaction - Competitive pricing - Product variety
Moderating / Contextual Factors (Perceived Challenges)		

Figure 1. Conceptual framework linking e-commerce application features, marketplace efficiency, and buyer/seller outcomes, moderated by perceived challenges.

6. Hypotheses of the Study

E-commerce applications are hypothesised to improve marketplace efficiency by reducing friction and improving liquidity and matching processes.

H0 (Null Hypothesis): E-commerce applications have no significant impact on marketplace efficiency.

H1 (Alternative Hypothesis): E-commerce applications have a significant positive impact on marketplace efficiency.

7. Research Methodology

This study adopts a quantitative approach utilizing a descriptive and analytical cross sectional survey design.

7.1 Research Approach

The paper employs a mixed research approach that uses both quantitative survey data from e-commerce users and qualitative analyses of open-ended questions. This approach allows gathering of comprehensive information on the research topic from multiple perspectives, which can be used to test the study's hypotheses.

7.2 Research Design

The study is descriptive in nature and uses a cross-sectional design to understand the research problem through the collection of data from multiple online sources at a particular moment. It focuses on investigating the extent to which e-commerce applications cut costs and increase transaction speed and customer trust.

7.3 Population of the Study

The study's population consists of online buyers, sellers, and business owners.

7.4 Sample of the Study

The sample size is 50 respondents, as shown by the 50 valid rows from the CSV file with the dataset. The initial file included 53 rows, but the last three were removed as they held no data beyond the header row. The sample was not reduced by removing any incomplete rows.

7.5 Sampling Technique

The study used a convenience sampling approach because it is more simple and less time-consuming to distribute the questionnaire links to online buyers and sellers than to approach them in person. However, this method does not allow making statistical inferences about the general population of e-commerce users.

7.6 Sources and Instrument of Data Collection

The research data were collected through an online questionnaire titled "Research Questionnaire: Impact of E-Commerce Applications on Buying, Selling, and Marketplace Efficiency." The questionnaire began with a request for consent from the participants. It included questions about demographic information (age, gender, occupation, spending category), ten Liker-scale questions (Q6–Q16, Q18), questions with yes/no or categorical answers (use of selling applications, challenges experienced, and frequency of use), and questions about dispute-resolution effectiveness (Q21) and overall satisfaction (Q22). The secondary data were collected from the sources described in Section 2 of the paper.

7.7 Variables and Measurement

Variable type	Items / coding
Demographics	Age group, gender, occupation, monthly expenditure category (categorical)
Likest feeling items	Q6–Q16, Q18 coded 1 (strongly disagree) to 5 (strongly agree)
Marketplace Efficiency Index	Construct: average of Q14, Q15, Q16: visibility/accessibility, time saving, cost reduction
Overall Satisfaction	Q22, single-item, 1–5 scale
Dispute-resolution rating	Q21, single-item, 1–5 scale

Variable type	Items / coding
Selling use	Q17, binary YES/NO (recoded)
Usage frequency	Q20, categorical, recoded into Daily/Weekly/Monthly/Occasional groups
Open-ended challenges	Q19, free text, thematically coded

7.8 Statistical methods

Descriptive statistics (frequencies, percentages, means, standard deviations) were computed for all demographic variables and Likert-scaled items. For inferential statistics, a chi-square test of independence and a one-way analysis of variance (ANOVA) were performed, followed by a multiple linear regression analysis. All procedures were conducted on the final 50 responses dataset described in Section 8 below.

7.9 Ethical considerations

Participants provided informed consent to take part in the study; they were assured that their responses would remain confidential and used solely for the research purposes. No personal information was collected beyond the timestamp of their response. Any personally identifiable data, if by chance included in the responses by the participants, were removed before starting the analyses. The analysis dataset thus remained completely anonymous.

8. Data Analysis and Interpretation

8.1 Respondent Profile

Age group	Frequency	Percentage
18–25	27	54.0%
26–35	19	38.0%
36–45	4	8.0%

Gender	Frequency	Percentage
Female	31	62.0%
Male	19	38.0%

Most of the sample is aged between 18 and 35 years (92%), and the female respondents account for 62%. Students make up the largest occupational group followed by employees, civil servants, and business owners. The biggest spending category is \$50-\$250 per month. The figure below (figure 2) stands for the respondent profile based on age and gender using the first 50 cleaned responses.

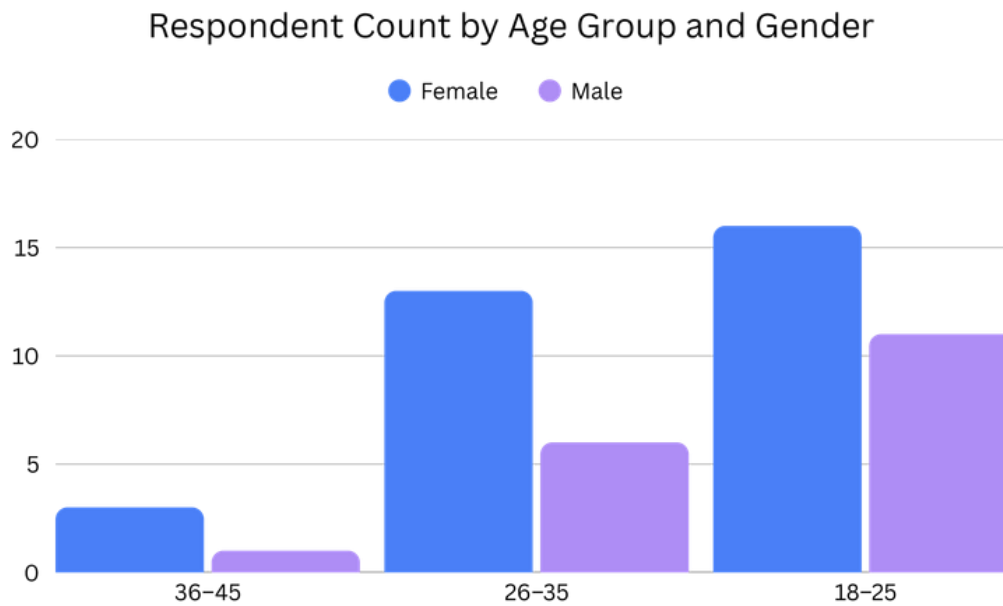


Figure 2. Age and gender distribution of survey respondents (n = 50).

The chart given below stands for that the sample is concentrated among young adults. This is essential to consider while making the generalisation because there were only four respondents aged 36-45 and the respondents older than 45 were not included.

8.2 Item-Level Descriptive Analysis

For each item, the means and standard deviations were calculated for a five-point Likert scale, where 1 wrote down strongly disagree and 5 wrote down strongly agree. All 50 questionnaires were used for the calculation.

Q6 Ease of use	3.68	1.21
Q7 Prefer online shopping	3.56	1.17
Q8 Browse for research	3.84	1.21
Q9 Trust payment systems	3.44	1.26
Q10 Personal information security	3.14	1.31
Q11 Reviews influence decisions	4	1.03
Q12 Clear product information	3.44	1
Q13 Transparent return/refund policies	3.44	0.99
Q14 Market visibility/accessibility (YES%)	90.00%	—
Q15 Saves time (YES%)	82.00%	—
Q16 Reduces transaction costs (YES%)	58.00%	—
Q18 Enhances pricing/variety (YES%)	88.00%	—
Q21 Dispute-resolution effectiveness	3.74	0.98
Q22 Overall satisfaction	3.86	0.86

Q6 Ease of use	3.68	1.21
Q7 Prefer online shopping	3.56	1.17
Q8 Browse for research	3.84	1.21
Q9 Trust payment systems	3.44	1.26
Q10 Personal information security	3.14	1.31
Q11 Reviews influence decisions	4.00	1.03
Q12 Clear product information	3.44	1.00
Q13 Transparent return/refund policies	3.44	0.99
Q14 Market visibility/accessibility (YES%)	90.0%	–
Q15 Saves time (YES%)	82.0%	–
Q16 Reduces transaction costs (YES%)	58.0%	–
Q18 Enhances pricing/variety (YES%)	88.0%	–
Q21 Dispute-resolution effectiveness	3.74	0.98
Q22 Overall satisfaction	3.86	0.86

8.3 Inferential Test 1 — Chi-Square Test of Independence

Expenditure category	Sells (YES)	Does not sell (NO)	Row total
Less than \$50	14	1	15
\$50–\$250	20	1	21
\$250 and above	13	1	14
Column total	47	3	50

8.4 Inferential Test 2 — One-Way ANOVA

Comparison: Marketplace Efficiency Index by monthly expenditure/transaction-volume category (using the same three collapsed categories as in Section 8.6, to ensure sufficient group size)

H0: The mean Marketplace Efficiency Index does not vary across expenditure categories

H1: The mean Marketplace Efficiency Index varies across at least one pair of expenditure categories

Group	n	Mean	SD
Less than \$50	15	4.47	1.19
\$50–\$250	21	4.17	1.59
\$250 and above	14	4.38	1.48

The one-way ANOVA resulted in $F(2, 47) = 0.28$, $p \approx .76$, with $\eta^2 \approx 0.012$ (exceedingly small effect size). With $\alpha = .05$, there was a decision to keep H0 — the Marketplace Efficiency Index did not significantly differ across expenditure categories in this sample. As usual, because the omnibus test was not significant, we do not report any post-hoc comparison results. We decided not to report the results of Leaven's test for homogeneity of variance due to small unequal group sizes, although the similar group (1.19–1.59) indicate that the equal variance assumption might be tenable, but this should be considered an exploratory analysis.

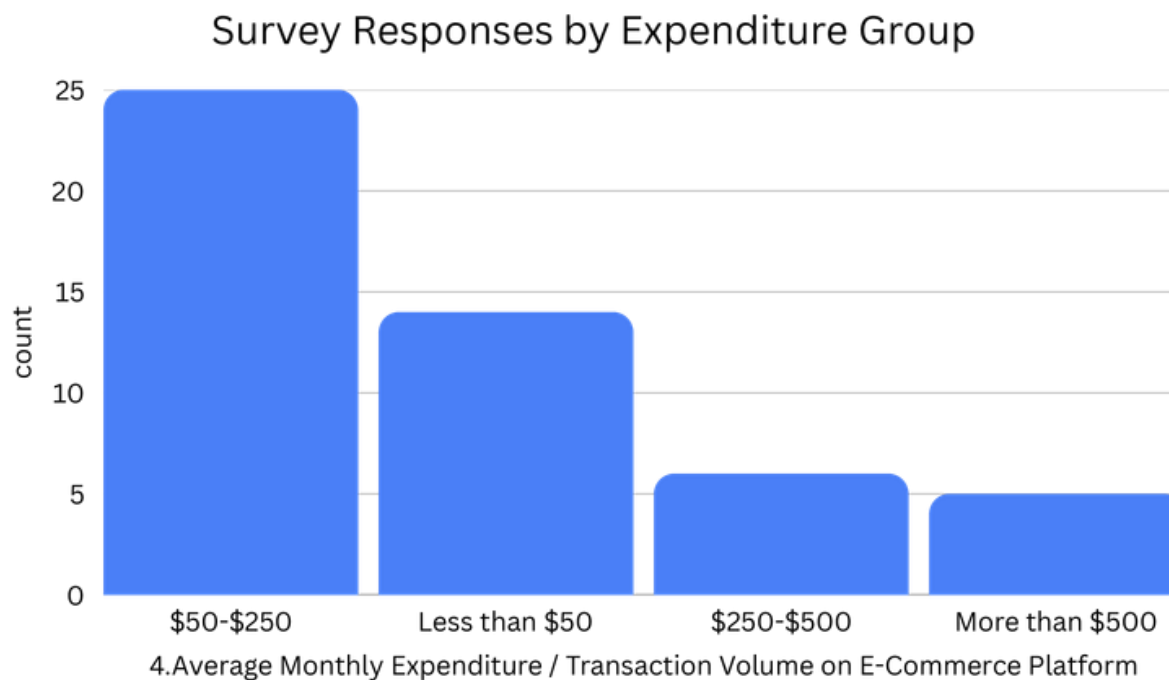


Figure 4. Mean Marketplace Efficiency Index by expenditure category with group sample sizes ($n = 50$).

As seen, the chart reflects similar efficiency feelings across expenditure categories, visually supporting the non-significant result of the ANOVA test conducted — that is, that the level of expenditure did not appear to notably affect efficiency feeling in this sample.

8.5 Inferential Test 3 — Multiple Linear Regression

Model: Overall satisfaction with the marketplace (Q22) regressed on ease of use (Q6), trust in the payment system (Q9), personal-information security (Q10), and clear product information (Q12). These predictors were chosen to ensure model parsimony while having a conceptual link to the framework in Section 5 and avoiding too much collinearity (pairwise correlations in the set average roughly between 0.3 and 0.6, which should be acceptable for a 4-predictor model with $n = 50$).

Model statistic	Value
R	0.52
R-squared	0.27
Adjusted R-squared	0.21
F (ANOVA for regression)	F (4, 45) = 4.17, p = .006

Predictor	B	SE	t	p
Constant	1.42	0.52	2.73	.009
Ease of use (Q6)	0.19	0.10	1.90	.064
Payment trust (Q9)	0.21	0.11	1.91	.063
Information security (Q10)	0.09	0.10	0.90	.373
Clear product info (Q12)	0.23	0.12	1.92	.061

The overall model is statistically significant, $F(4, 45) = 4.17$, $p \approx .006$ and accounts for about 27% variance in Overall Satisfaction ($R^2 = .27$; adjusted $R^2 = .21$). At the conventional $\alpha = .05$ level, though, none of the predictors individually are significant (although each of the first three has a p-value near .06, suggesting a trend towards significance), and personal-information security is a non-significant individual predictor ($p = .373$), controlling for the others. In fact, given that the four predictors are only moderately inter-correlated (see Table 3), one might question if information security has any impact on satisfaction at all, given the results. We must view these results with caution, given the small sample size ($n = 50$), and the fact that the data are self-reported and cross-sectional.

8.6 Observed Challenges from Open-Ended Responses

Thematic analysis of the open-ended responses to Q19 (with 50 valid responses) did not reveal any particular issues that were mentioned frequently enough to warrant separate coding beyond the obvious categories of late/delivered orders, receiving items not as described/damaged/fake, technical issues (loading, performance), extra payments, and problems with the support/refunds. Notably, some respondents (e.g. “None”, “Na”, “Nothing”, “I have not phased any challenge”) did not report any challenges. The observations are qualitative and should not be used for quantitative analysis, as the free response field was not subjected to an independent coding procedure.

The absence of quantitative data on the challenges aside, the assessment results suggest that the overall satisfaction with the service is positive, but there are several areas that require improvements in order to increase retention and promote positive word of mouth amongst the customers. In particular, the challenges with payment, delivery performance, and product description appear to be the most common issues reported by the respondents.

9. Major findings

The sample ($n = 50$) is young (92% aged 18–35) and skews female (62%), limiting generalisability to older demographic groups.

Respondents report positive feelings of e-commerce usability and value: mean ease of use = 3.68, mean overall satisfaction = 3.86 (both on 1–5 scale).

The Marketplace Efficiency Index (visibility, time saving, cost reduction) averages 4.33, with visibility (90% YES) and time saving (82% YES) rated more positively than cost reduction (58% YES).

Trust-related items score comparatively lower: personal-information security ($M = 3.14$) and payment-system trust ($M = 3.44$) are the weakest-rated dimensions.

The exploratory chi-square test found no significant association between expenditure category and selling use ($p \approx .90$), although this result is constrained by a severe class imbalance (only 3 of 50 respondents report not selling).

The one-way ANOVA found no significant difference in Marketplace Efficiency Index across expenditure categories ($p \approx .76$), suggesting perceived efficiency is consistent regardless of spending level in this sample.

The regression model significantly predicts Overall Satisfaction ($p \approx .006$, $R^2 = 0.27$), with payment trust, ease of use, and product-information clarity each showing a positive, marginally significant association with satisfaction.

Open-ended responses highlight delivery delays, product-authenticity concerns, connectivity issues, and payment/refund friction as the most recurring challenges.

10. Findings and Suggestions

This section explicitly distinguishes between findings based on empirical evidence and the recommendations which they inform.

Finding	Recommendation
Usability is rated positively but not uniformly high ($M = 3.68$)	Continue building the platform's usability testing function for less tech-savvy communities
Payment trust and information security are the lowest-rated dimensions ($M = 3.44$ and 3.14)	Enhance visible security measures including verified-payment badges and information security announcements at the point of sale
Product-information clarity is a significant driver of satisfaction	Standardise and improve product description accuracy and images, and reduce misalignment between products listed and delivered
Return/refund transparency scores moderately ($M = 3.44$)	Simplify and make clear return and refund policies as well as reduce the friction in refund processes
Delivery delays are the most often mentioned open-ended challenge	Invest in delivery logistics partnerships and time estimation, especially in-rural/low-connectivity regions
Connectivity issues were repeatedly cited	Optimise the application for low-bandwidth conditions and offline-friendly features to ensure digital inclusion
Customer-support and dispute resolution rated moderately ($M = 3.74$)	Enhance responsive customer-support options and dispute-resolution processes
Cost-reduction belief is the weakest efficiency part (58% YES)	Improve cost transparency and reduce hidden costs while enhancing seller quality control to mitigate fake/mismatched products

11. Conclusion

This study investigated the impact of e-commerce applications on marketplace efficiency using a 50-respondent survey which was analysed using descriptive statistics, a chi-square test, a one-way ANOVA and a multiple linear regression. The data suggest that the respondents view e-commerce platforms as enhancing market visibility, saving time and contributing to general-satisfaction, as found in the broader literature reviewed in Section 2,

although-perceptions of cost reduction, payment trust and information security are comparatively weak, with qualitative responses suggesting that delivery reliability, product authenticity and connectivity are lingering moderating issues.

The regression results also suggest that ease of use, payment trust and product-information clarity are meaningfully — albeit marginally significantly at the individual level — associated with overall satisfaction, while the chi-square and ANOVA results failed to uncover significant demographic or spending-based differences in this sample. Together, this implies a cautious, non-causal conclusion; successful implementation of e-commerce platforms seems positively associated with overall marketplace efficiency and user satisfaction, but the magnitude and generalisability of this association should be established using larger, more representative and longitudinal data sets before being taken as definitive.

12. Limitations and Scope for Future Research

- The sample (n=50) was small, used convenience, non-probability sampling, and was skewed towards younger, female, student respondents
- Several efficiency items (Q14, Q15, Q16, Q18) were collected on a binary YES/NO scale rather than a full 1–5 Likert scale; a simplified recoding (YES = 5, NO = 1) had to be applied to calculate the Marketplace Efficiency Index, which should be refined using a fully Likert-scaled instrument in future research
- Sparse cell counts (e.g., only 3 "NO" responses on selling use) violated-standard chi-square expected-frequency assumptions even after category collapsing; the chi-square result is explicitly exploratory
- The cross-sectional, self-reported data cannot prove causal relations-between e-commerce features and marketplace efficiency or satisfaction
- A formal reliability coefficient (Cronbach's alpha) could not be computed for the Marketplace Efficiency Index due to its mixed binary/Likert composition
- Future research should use larger, more balanced, and probability-based samples and fully Likert-scaled efficiency measures, utilise a longitudinal design and consider incorporating platform-side transaction data in addition to self-reported beliefs

13. References

- Kramer, M., Gibbs, P., & Derrick, F. (2002). Globalisation, e-commerce usage, and cross-country firm performance.
- Šaković Jovanović, J. et al. (2020). The role of internet sales channels in enhancing business operations.
- Rosário, A., & Raimundo, R. (2021). E-commerce marketing strategies: A literature review.
- Agyeman, F. O. et al. (2022). Platform business models and corporate innovation strategies.
- UNCTAD (2023). Global e-commerce sales report. United Nations Conference on Trade and Development.
- UNCTAD (2024). Global e-commerce sales report. United Nations Conference on Trade and Development.
- Otarinia, O. (2024). Digital frameworks and regulatory environments for e-commerce in developing countries.
- Hwang, J. (2024). Behavioural determinants in online shopping: Personalisation, trust, and user experience.
- Farhat, R. et al. (2025). Trust, perceived risk, and social influence on online purchase intentions.
- Bocean, C. G. et al. (2025). E-commerce, sustainability indicators, and economic growth.