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E-Commerce Participation Among Urban Low-Income Group in Malaysia: Assessing the E-Commerce Infrastructure

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Abstract: *In the digital era, e-commerce has reshaped the landscape of business transactions, offering a contemporary avenue for buying and selling goods and services globally. Malaysia, like many nations, has embraced this digital transformation, with the Malaysian government actively promoting e-commerce initiatives to foster economic growth and innovation. This study explores the availability and adequacy of infrastructure facilities supporting e-commerce activities that may influence the low-income group in urban state in Malaysia to participate in e-commerce. By gathering empirical insights from a survey targeting low-income individuals engaged in e-commerce and those who are not, the study contributes to the discourse on promoting e-commerce and fostering digital empowerment within Malaysia's low-income communities. The study endeavours to enhance economic opportunities and livelihoods of urban communities through informed policy recommendations and interventions.*

Keywords: Low-Income Group, E-Commerce, Urban, Infrastructure, Malaysia

1. Introduction

In the digital age, e-commerce has revolutionized the way business transactions occur, offering a modern avenue for buying and selling goods and services through online platforms. With the advent of the internet, e-commerce has transcended geographical boundaries, providing individuals and businesses with unprecedented opportunities for trade and commerce (Turban et al., 2008, p. 4). Malaysia, like many nations, has embraced this digital transformation, with the Malaysian government actively promoting e-commerce initiatives to foster economic growth and innovation.

Amidst this backdrop, the state of Selangor which is one of the urban states in Malaysia emerges as a significant player in Malaysia's e-commerce landscape. With a household median income of RM9,983 in 2022, Selangor epitomizes urban vibrancy and economic dynamism within Malaysia. Recognizing the potential of e-commerce to empower businesses, especially among the Bottom 40% (low-income) group, the Selangor government has launched strategic initiatives aimed at facilitating digital transformation and e-commerce adoption among Small and Medium Enterprises (SMEs).

The Malaysian government's initiatives to boost e-commerce have gained momentum, especially due to the Covid-19 pandemic. Lockdowns and movement restrictions have

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accelerated the shift towards online shopping, further underscoring the importance of e-commerce in modern business transactions. As a result, Malaysia's e-commerce market is experiencing exponential growth, positioning the nation as the 33rd largest market globally, with a predicted revenue of US$8,567.7 million by 2023.

Given the rise in e-commerce activity, it is crucial to identify infrastructure facilities that would support e-commerce adoption, including things like digital banking services, internet access, and logistics support. Studies from other countries in the world such as China, Indonesia, and Iran indicate that infrastructure plays a role in influencing e-commerce adoption among small businesses owners and rural area communities (Hajli et al., 2014; Lin, 2019; Lin et al., 2021; Ariansyah et al., 2021).

Therefore, this study aims to explore the infrastructure facilities that may influence the low-income group in urban state in Malaysia to participate in e-commerce. By gathering empirical insights from a survey targeting both low-income e-commerce sellers and non-sellers, the study intends to contribute to the ongoing discourse on infrastructure facilities and e-commerce participation among the urban low-income community. Ultimately, the goal is to enhance economic opportunities and livelihoods of urban communities.

2. Literature Review

Infrastructure is recognized as a pivotal factor influencing the adoption of e-commerce, as evidenced by numerous studies (Jennex et al., 2004; Hajli et al., 2014; Choshin & Ghaffari, 2017; Lin, 2019; Chao et al., 2021; Lin et al., 2021; Ariansyah et al., 2021). For instance, Jennex et al. (2004) emphasize the importance of a country's infrastructure in determining the success of startup B2B e-commerce ventures in developing economies. Similarly, Hajli et al. (2014) find that infrastructure plays a crucial role in shaping the dynamics of e-commerce adoption among SMEs in Iran. These findings highlight infrastructure as a consistent factor influencing e-commerce adoption across different regions.

Choshin & Ghaffari (2017) investigate the factors affecting the success of e-commerce ventures among SMEs in Azerbaijan. Their study reveals that technological infrastructure, internet speed, and network traffic are critical determinants of e-commerce success. Lin (2019) examines the impact of e-commerce and immigration on urbanism in China, finding that information and communication technology (ICT) infrastructure significantly contributes to the growth of e-commerce, particularly among rural migrants. Similarly, Liu et al. (2021) analyze the willingness of farmers in China to participate in e-commerce and find that infrastructure factors such as network coverage and access to smart devices positively correlate with farmers' readiness to engage in e-commerce activities.

In another study conducted in China, Lin et al. (2021) explores the factors influencing participation in e-commerce among poor households in Mongolia. They find that infrastructure, social networks, cognitive factors, and resource endowment significantly impact the involvement of poor households in e-commerce. The authors recommend that local governments in poor regions should enhance the infrastructure and increase internet penetration to optimize the rural e-commerce environment. In a different context, Ariansyah et al. (2021) investigate the factors influencing Indonesian individuals' decisions to make online purchases. They find that characteristics such as gender, age, marital status, education level, entrepreneurial mindset, internet access, logistic and financial services availability, digital skills, and exposure to harmful content influence online purchasing behavior. These findings

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underscore the importance of addressing infrastructure-related challenges to promote inclusive e-commerce adoption and maximize the sector's contribution to the national economy.

In summary, the relationship between infrastructure and e-commerce participation justifies further exploration particularly among urban low-income group in Malaysia.

3. Research Methodology

In this study, we employed a purposive sampling technique to select participants based on specific criteria relevant to our research objective, which is to investigate the influence of infrastructure facilities on e-commerce participation among low-income group in Selangor. The online survey was conducted from July 2022 to August 2023 and distributed via email to online merchants. Additionally, we shared the survey link on relevant Facebook groups of Selangor merchants. We also engaged directly with merchants at locations such as Uptown Damansara and the Selangor State Development Corporation (PKNS) complex to gain insights from those not involved in e-commerce.

The questionnaire was developed based on existing literature on infrastructure facilities for e-commerce participation and adapted to the Malaysian e-commerce context (Lin et al., 2021; Ariansyah et al., 2021). It comprised three sections: Section A gathered information about the type of e-commerce participation, Section B focused on infrastructure facilities for e-commerce business in Selangor, and Section C collected socio-demographic information about the respondents. We employed a five-point Likert-type scale ranging from "1=strongly disagree" to "5=strongly agree" to measure variables related to infrastructure facilities for e-commerce, including Internet coverage in my area has helped me in my e-commerce business, fast and stable internet connection has helped me in my e-commerce business, courier service has helped me in my e-commerce business, accessibility to ParcelHub has helped me in my e-commerce business, accessibility to digital banking service such as ATM service, internet banking, mobile banking has helped me in my e-commerce business and infrastructure facilities encourage me to use e-commerce.

Data analysis was conducted using the Statistical Package for Social Sciences (SPSS) version 26. Descriptive analysis was utilized to examine the data, while Cronbach's Alpha analysis was performed to assess the reliability (internal consistency) of the questionnaire items. The results indicated that all reliability alphas exceeded the threshold of 0.60, indicating good internal consistency (Nunnally and Bernstein, 1994). We provided two versions of the questionnaire, one in English and one in Malay, to accommodate respondents' language preferences. In total, 162 respondents, categorized as a low-income group, participated in the study.

4. Research Findings

Profile of Respondents

Figure 1 illustrates type of e-commerce participation among respondents, presenting the number and percentage of those who answered affirmatively and negatively to engaging in e-commerce activities.

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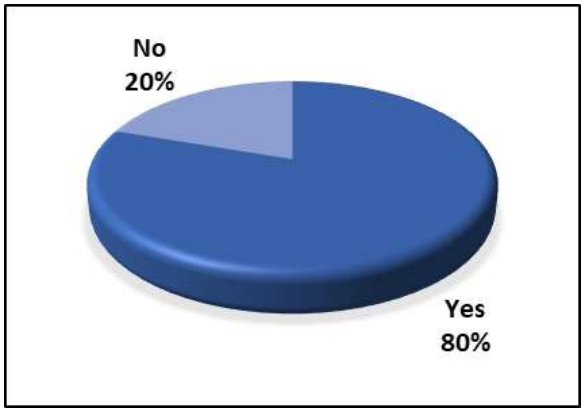


Figure 1: E-commerce participation

Based on Figure 1, out of the total respondents, 130 individuals, constituting 80% of the sample, reported participating in e-commerce. In contrast, 32 respondents, representing 20% of the surveyed population, indicated a lack of involvement in e-commerce. This high level of participation underscores the increasing prominence and widespread adoption of e-commerce platforms in contemporary consumer behavior. As e-commerce continues to evolve and expand, businesses and stakeholders must recognize and capitalize on this trend to effectively engage with consumers and navigate the dynamic landscape of digital commerce.

Furthermore, Table 1 presents demographic information about the respondents. Among those involved in e-commerce, 80 (49.38%) are female, and 50 (30.82%) are male. In terms of age distribution, the largest group falls within the 19-29 years old category, accounting for 53 (32.72%) respondents, followed by 48 (29.62%) in the 30-39 age group. Concerning marital status, a significant proportion of respondents are married, totaling 72 (44.44%), while 55 (33.92%) are single, and 3 (1.85%) are divorced or single parents. Ethnicity-wise, most of respondent engaged in e-commerce are Malay, comprising 103 (63.58%) of the respondents, followed by 22 (13.58%) of Chinese ethnicity, 2 (1.23%) of Indian ethnicity, and 3 (1.85%) from other ethnic backgrounds. Regarding educational attainment, a notable portion holds a bachelor's degree, constituting 57 (35.19%) of the respondents. Moreover, 42 (25.93%) respondents have other full-time jobs besides their e-commerce ventures. In terms of household income, 64 (39.51%) of the e-commerce sellers reported an income of less than RM2,500.

Table 1: Profile of Respondents

Demographic Characteristic	**E-commerce Participation (n=162)**	
	Yes	**No**
Gender		
Male	50 (38.46%)	0 (0%)
Female	80 (61.54%)	32 (100%)
Total	**100%**	**100%**
Age		
18 and below	2 (1.54%)	19 (59.38%)
19-29	53 (40.77%)	5 (15.62%)
30-39	48 (36.92%)	8 (25%)
40-49	22 (16.92%)	0 (0%)
50-59	4 (3.08%)	0 (0%)
60 and above	1 (0.77%)	0 (0%)
Total	**100%**	**100%**

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Marital		
Single	55 (42.31%)	20 (62.5%)
Married	72 (55.38%)	12 (37.5%)
Divorce/Single Parents	3 (2.31%)	0 (0%)
Total	**100%**	**100%**
Race		
Malay	103 (79.23%)	27 (84.38%)
Chinese	22 (16.92%)	0 (0%)
Indian	2 (1.54%)	5 (15.62%)
Other	3 (2.31%)	0 (0%)
Total	**100%**	**100%**
Education		
SPM	12 (9.23%)	6 (18.75%)
STPM/Matriculation/Foundation	9 (6.92%)	1 (3.13%)
Diploma	29 (22.31%)	7 (21.88%)
Degree	57 (43.85%)	15 (46.88%)
Master	16 (12.31%)	2 (9.36%)
PhD	6 (5.38%)	0 (0%)
Other	0 (0%)	0 (0%)
Total	**100%**	**100%**
Employment		
Self-employment	42 (32.31%)	10 (31.25%)
Government Sector	13 (10%)	3 (9.38%)
Private Sector	42 (32.31%)	8 (25%)
Full-time Student	17 (13.08%)	5 (15.62%)
Housewife	12 (9.23%)	2 (6.25%)
Unemployment	3 (2.31%)	4 (12.5%)
Retiree	1 (0.76%)	0 (0%)
Total	**100%**	**100%**
Monthly Household Income Category		
B1 (RM2,500 Below)	64 (49.23%)	8 (25%)
B2 (RM2,501 – RM3,170)	15 (11.54%)	11 (34.38%)
B3 (RM3,171 – RM3,970)	45 (34.62%)	8 (25%)
B4 (RM3,971 – RM4,850)	6 (4.61%)	5 (15.62%)
Total	**100%**	**100%**

Reliability test

Cronbach's alpha was employed to assess the reliability of the questionnaire. Cronbach's alpha is widely used as a measure of internal consistency reliability and is interpreted as a correlation coefficient within the range of 0 to 1. When evaluating reliability, an alpha value below 0.6 is deemed unacceptable, whereas a value exceeding 0.6 is considered acceptable for the questionnaire (Hair et al., 2003).

Table 2: Reliability Analysis

Variable	Number of Items	Cronbach's Alpha
Infrastructure	6	0.956

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Table 2 shows Cronbach's Alpha values for 0.956. This suggests that all the items for the infrastructure measurement possess strong internal consistency, indicating a high level of reliability in the measurement instrument used in the study. Such robust reliability underscores the trustworthiness and consistency of the data collected, enhancing the validity of the research findings, and bolstering confidence in the conclusions drawn from the study.

Mean and Standard Deviation of Infrastructure

Table 3 provides insight into various infrastructure items and their perceived impact on respondents' e-commerce businesses. The mean and standard deviation values offer an understanding of the level of agreement and consistency among respondents regarding the influence of these infrastructure elements. There are six questions related to infrastructure that being asked in the survey: Internet coverage in my area has helped me in my e-commerce business, fast and stable internet connection has helped me in my e-commerce business, courier service has helped me in my e-commerce business, accessibility to ParcelHub has helped me in my e-commerce business, and lastly, accessibility to digital banking service such as ATM service, internet banking, mobile banking has helped me in my e-commerce business and infrastructure facilities encourage me to use e-commerce.

Table 3: Infrastructure Items

Items	Mean	Std. Deviation
Accessibility to digital banking service such as ATM service, internet banking, mobile banking has helped me in my e-commerce business.	4.07	0.797
Fast and stable internet connection has helped me in my e-commerce business.	4.02	0.807
Courier service has helped me in my e-commerce business.	4.02	0.815
Accessibility to ParcelHub has helped me in my e-commerce business.	3.98	0.830
Internet coverage in my area has helped me in my e-commerce business.	3.91	0.791
Infrastructure facilities encourage me to use e-commerce.	3.72	1.096
Overall Mean	**3.95**	

** Five-points scale: 1 = Strongly Disagree; 5= Strongly Agree*

Based on findings in Table 3, respondents highly value accessibility to digital banking services, such as ATM, internet banking, and mobile banking, with a mean score of 4.07 and a standard deviation of 0.797. In addition, fast and stable internet connection and courier services are also regarded favourably, both receiving mean scores of 4.02, with standard deviations of 0.807 and 0.815, respectively. The accessibility to ParcelHub, with a mean score of 3.98 and a standard deviation of 0.830, is also perceived positively in supporting e-commerce activities.

While slightly lower, internet coverage in respondents' areas still contributes positively to e-commerce, with a mean score of 3.91 and a standard deviation of 0.791. However, infrastructure facilities, while still generally encouraging e-commerce usage, have a lower mean score of 3.72 and a higher standard deviation of 1.096, indicating more variability in respondents' perceptions.

Overall, the mean score across all infrastructure items is 3.95, indicating a generally positive perception of the role of infrastructure in supporting e-commerce activities among respondents. These findings underscore the importance of robust digital banking services, reliable internet connectivity, efficient courier services, and accessible infrastructure facilities in fostering a conducive environment for e-commerce. Improving and expanding these infrastructure elements can further enhance the growth and sustainability of e-commerce ventures, ultimately benefiting businesses and consumers alike.

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Most Used Device for E-Commerce Business

This study also explores the devices utilized for e-commerce endeavours; a variety of devices were reported by the respondents. The most prevalent device used for e-commerce transactions is the smartphone, with 147 respondents, constituting 90.74% of the surveyed population. Following closely behind, laptops were reported by 129 respondents, representing 79.62% of the sample. In comparison, the usage of iPads or tablets was reported by 79 respondents, accounting for 48.77% of the respondents. Conversely, desktop computers were the least commonly used device, with only 61 respondents, comprising 37.65% of the total sample.

Table 4: Device Used for E-Commerce Business

Device	Frequency (%)
Smartphone	147(90.74)
Laptop	129(79.62)
iPad/Tablet	79(48.77)
Desktop	61(37.65)

These findings suggest a significant reliance on mobile devices, particularly smartphones, for conducting e-commerce activities among the surveyed sample. The high prevalence of smartphone usage underscores the importance of optimizing e-commerce platforms for mobile interfaces and catering to the needs of users accessing these platforms through handheld devices. While laptops relatively remain a popular choice, the declining usage of desktop computers indicates a shift towards more portable and versatile devices for online shopping and business transactions. As e-commerce continues to evolve, understanding and adapting to these trends in device usage are crucial for businesses to effectively engage with their customers and remain competitive in the digital marketplace.

The Barrier of Infrastructure to Adoption E-Commerce

In addition, we also asked the non-e-commerce sellers the reason they are not participating in e-commerce. Table 5 explores the barriers to the adoption of e-commerce, focusing on infrastructure-related challenges. Table 5 presents responses indicating the presence or absence of certain barriers, expressed as percentages of respondents who answered affirmatively or negatively to specific items.

Among the non-e-commerce respondents, 40.6% acknowledge the absence of a device, such as a laptop, smartphone, or iPad/tablet, as a hindrance to their adoption of e-commerce, while 59.4% indicate they do possess such devices. Similarly, 43.8% of respondents indicated the expensive nature of internet fees as a barrier, while 50% of respondents answered that poor internet connection is one of the barriers to e-commerce adoption.

Table 5: Barrier of Infrastructure to Adoption E-Commerce

Item	Yes (%)	No (%)
No device (such as a laptop, smartphone, or iPad/tablet).	13(40.6%)	19(59.4%)
Internet fees are too expensive for me.	14(43.8%)	18(56.3%)
Lack of infrastructure, such as poor internet connection.	16(50%)	16(50%)
Total	**32(100%)**	

These findings suggest that to facilitate wider adoption of e-commerce, efforts should focus on addressing these barriers, including providing affordable access to devices and internet services and improving overall internet infrastructure. By mitigating these obstacles, opportunities for

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broader participation in the digital economy can be realized, enhancing inclusivity and economic development.

5. Conclusion

In conclusion, this study delves into the infrastructure factors influencing the participation of low-income groups in urban areas of Malaysia in e-commerce activities. The findings emphasize the pivotal role of infrastructure in shaping e-commerce engagement among low-income populations, particularly within urban settings. Key elements such as access to internet coverage, fast and reliable internet connections, efficient courier services, and the availability of digital banking facilities emerge as critical contributors to e-commerce success among this demographic.

Despite strides made in promoting e-commerce and digital transformation, persistent challenges confront low-income groups. A significant segment of respondents expresses reluctance to pursue e-commerce ventures, citing concerns over the high costs associated with e-commerce platforms, expensive internet fees, and infrastructure limitations. Limited access to essential electronic devices and infrastructure, compounded by perceived governmental support challenges, pose formidable barriers to e-commerce participation among low-income individuals.

Mitigating these challenges and fostering inclusive e-commerce participation necessitates multifaceted strategies. Initiatives aimed at enhancing access to affordable electronic devices, reducing internet fees, and improving infrastructure facilities are imperative to empower low-income groups to engage meaningfully in e-commerce endeavors. Furthermore, collaborative efforts from public and private sectors are essential to bolster infrastructure development and provide targeted support to low-income communities, thereby cultivating an environment conducive to e-commerce growth and innovation throughout Malaysia.

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