

INTERNATIONAL JOURNAL
ON INFORMATICS VISUALIZATIONjournal homepage : www.joiv.org/index.php/joivThe study on Malaysia Agricultural E-Commerce (AE):
A Customer Purchase IntentionKai Wah Hen ^a, Choon Sen Seah ^{b,*}, Deden Witarsyah ^c, Shazlyn Milleana Shaharudin ^d, Yin Xia Loh ^b^a International College, Tunghai University, Taiwan^b Faculty of Accountancy and Management, Universiti Tunku Abdul Rahman, Bandar Sungai Long, Kajang, Malaysia^c Department of Information System Telkom University Bandung, Indonesia^d Department of Mathematics, Faculty of Science and Mathematics, Universiti Pendidikan Sultan Idris, Tanjung Malim, Perak, Malaysia

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Abstract— Electronic commerce (E-Commerce) became an essential trading platform after the Covid-19 pandemic. From essential products to luxury brands, consumers can find almost everything on normal E-Commerce platforms except fresh agricultural products. Agricultural E-Commerce (AE) is introduced to overcome market needs, especially during the pandemic. Technology Acceptance Model (TAM) is studied and integrated with additional variables to determine the needs of AE in Malaysia. This study studied five variables (product quality, logistic service quality, perceived price & value, platform design quality, and platform security) to determine Malaysian consumers' purchase intention towards AE. Five hypotheses were developed to identify the relationship between the variables. A total of 300 AE users have contributed their perceptions as respondents in this study through a survey questionnaire. The survey questionnaire was distributed through non-probability sampling techniques. The collected data were processed before the data analysis via Statistical Package for The Social Science (SPSS) version 25.0. Descriptive analysis and inferential analysis were conducted. The result shows that all five variables are significantly related to the purchase intention towards AE. The product quality has the highest significant value (0.805) towards the purchase intention on AE, followed by logistic service quality, platform security, platform design quality, and perceived price and value. Implications, limitations, and recommendations were also discussed to assist the AE stakeholders in improving their AE.

Keywords— Agricultural E-commerce; purchase intention; technology adoption; Malaysia.

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I. INTRODUCTION

The emergence of E-Commerce across the globe has brought many conveniences to most businesses, enabling them to grow rapidly in their sales. This is because the dependency on the internet nowadays is significant for businesses to advertise their products. Despite that, some regions in the world are still not well developed in the implication (applications) of E-Commerce [1]. For instance, in several developing countries, digital transformation was restricted in adoption due to the low-level infrastructure [2]. However, in developing countries, the application of E-Commerce has started to follow the trends and steps of some leading Asia countries such as China [3]. E-Commerce in China has provided a great shopping experience to consumers due to the technologies and creativity. More than five business models are applied to digitize the businesses, including

Business to Business (B2B), Business to Customer (B2C), Customer to Business (C2B), Consumer to consumer (C2C), Government to Business (G2B) [1]. In China, fresh agricultural products such as flowers, vegetables, seafood, and meat can be purchased and sold online with the guarantee of freshness and quality [4]. Artificial Intelligence is being implemented in many industries, including retail, and food and beverage, to provide a better shopping experience [5], [6].

The combination of E-Commerce and Agriculture can help farmers grow their incomes by strategically facilitating and fine-tuning the structures of agriculture and rural economics [7]. The introduction of Agricultural E-Commerce (AE) will provide better market access for small farmers to market their products [8]. Initiatives were taken to help farmers access information, such as the establishment of agricultural agency websites that convey the latest information and knowledge, helping the farmers on the right track of the latest trend [9]. Besides, consumers' awareness and knowledge can influence

the development of AE. By accruing consumers' attention and their intention to purchase, AE became a common platform in China [10].

Studies by Xie [9] provided an essential finding in which the supply of AE is initiated by consumer demand. However, the findings could not be applied in Malaysia due to the small demand and population size [11]. In Malaysia, the infrastructure and resources to supply the technologies for digitalization are still not yet saturated [12]. Hence, AE could become a competitive advantage within the market yet be expensive to implement [13]. Besides, a mature and interactive E-Commerce platform could add value to the consumers' shopping experience [14]. By studying consumers' purchase intention, this study could identify the necessity and needs of AE in Malaysia.

This study investigates the factors that affect customers' purchase intention toward agricultural products through E-Commerce platforms in Malaysia. The factors include product quality, logistic service quality, perceived price & value, platform design quality, and platform security.

II. MATERIAL AND METHODS

In this study, Technology Acceptance Model (TAM) is studied [15] and integrated with additional variables to determine the needs of AE in Malaysia. According to Davis in 1989, TAM is applicable to discuss the framework of an information technology adoption [15]. This model aims to analyze new information technology adopted by users. The variables applied in this study were reviewed as follows.

A. Purchase Intention

Purchase intention refers to the chance and desire of consumers to purchase certain goods [16]. Moreover, it is a plan made by a consumer before purchasing a certain product that is needed hereafter [17]. Narayanan et al. [18] concluded that higher purchase intention would increase consumers' probability of purchasing.

B. Product Quality

Total Quality Management has been developed to reduce costs and improve consumer satisfaction, preserving company's competitive advantage [19]. Studies proved that the quality of a product could be influenced by its design and process control [20]. In this study, product quality is defined as the quality of the agricultural products sold on the AE, and quality can refer to the freshness and intactness of the vegetables, seafood, and meat.

C. Logistic Service Quality

Logistic service quality has been recognized as a vital factor influencing customer satisfaction [21]. Logistics is a process that will be placed at the end of online trading commodity distribution. In other words, it is also defined as the final stage of e-commerce activities [22]. In this study, logistic service quality is defined as the quality of the logistic services served by the AE. The quality can refer to the timeframe and deliverability of the parcels.

D. Perceived Price and Value

Before making a purchase decision, consumers will always consider the value of a product [23]. The perceived value is

defined as an evaluation of the usage of a certain product by comparing expectations with reality [24]. Perceived value is an exchange between perceived quality and perceived price, and both become factors that affect perceived value [25]. This study defines the perceived price and value as the value of the agricultural products sold on the AE, and the value can refer to the price of the products.

E. Platform Design Quality

Business interaction today has been simplified into an advanced E-Commerce application [26]. Although websites are effective tools for marketers to proceed with e-commerce activities, it still requires efforts from marketers to improve [27]. In this study, the platform design quality is defined as the quality of the AE from the design perspective. The design can refer to the AE's frame, icon, color, and layout.

F. Platform Security

Security is one of the important gateways for an E-Commerce platform [28]. During online shopping, consumers will need to provide their personal information or other confidential trading information to smooth the trading process [29]. The safety of an E-Commerce platform would highly depend on the security gateway, especially the payment gateway. In this study, platform security is defined as the safety of the AE. Security can refer to the reputation and trustworthiness of consumers to purchase online.

A total of five hypotheses were created to investigate the relationship between purchase intention and the overall quality of AE. The relationship between each variable and the hypothesis is illustrated in Fig. 1.

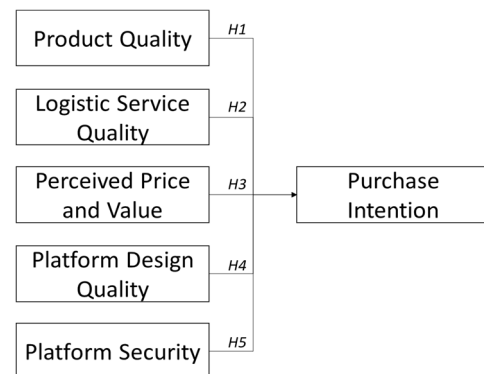


Fig. 1 The proposed research theoretical framework

This framework was extracted and modified from Gao's model, which was developed from TAM [30]. Five independent variables which would affect the dependent variable are studied. These independent variables are product quality, logistic service quality, perceived price and value, platform design quality, and platform security. The dependent variable is purchasing intention. Based on the theoretical framework, this study proposed the following hypotheses:

- H1: Product quality has a positive impact on the consumer purchase intention on AE.
- H2: Logistic service quality has a positive impact on the consumer purchase intention on AE.
- H3: Perceived price and value have a positive impact on the consumer purchase intention on AE.

- H4: Platform design quality has a positive impact on the consumer purchase intention on AE.
- H5: Platform security has a positive impact on the consumer purchase intention on AE.

The quantitative approach was included in this study to validate the proposed framework. It is defined as examining the relationship between variables using statistical processes to test objective theories [31]. A quantitative approach is a method for researchers to collect the information after the distribution of a questionnaire and use it for hypothesis testing purposes [32]. A total of 300 respondents were selected through non-probability sampling techniques. According to McCombes [33], a sample size of 200-400 is sufficient for research in new area as the actual population does not represent the actual users. In this study, the targeted respondents are Malaysians who have experience in purchasing agricultural products online through E-Commerce platforms.

The data was collected through Google Survey Form. The questionnaire consists of 3 sections which encompass 30 questions. The first section consists of 6 questions related to respondent's demographic and usage of e-commerce. In comparison, the second section consists of 20 questions in 4 questions for each independent variable. Lastly, the third section consists of 4 questions about the dependent variable, purchase intention. The questions in the first section use nominal scale and ordinal scale, while interval scale with 5 points Likert scale questions was applied in the second and third sections.

The collected data was filtered and cleaned to ensure the significance of data. Two filtering questions related to the purchased history in the E-Commerce platform were asked after the demographic questions. Descriptive, reliability and inferential analyses were conducted to study the collected data.

III. RESULT AND DISCUSSION

A. Descriptive Analysis

The demographic profile and general information of respondents were analyzed using descriptive analysis in this study. The metadata of the respondents is presented in Table 1.

TABLE I
DEMOGRAPHIC PROFILE AND GENERAL INFORMATION

Demographic Profile	Categories	Frequency	Percentage (%)
Gender	Female	182	60.6
	Male	118	39.3
Age	less than 18 years old	20	6.7
	18-29 years old	110	36.7
	30-39 years old	137	45.7
	40-49 years old	25	8.3
	50 and above years old	8	2.7
Occupation	Public Sectors	55	18.3
	Private Sectors	142	47.3
	Unemployed	44	14.6
	Freelancer	48	16.0
	Below RM2000	41	13.7

Demographic Profile	Categories	Frequency	Percentage (%)
Personal Monthly Income	RM2000- RM3999	141	47.0
	RM4000- RM5999	106	35.3
Frequency in a purchased product on E-Commerce per month	RM6000 and above	12	4.0
	Less than 3 times	4	1.4
	3 – 5 times	27	9.0
	6 – 8 times	130	43.3
Experience in purchasing fresh agricultural online	9 and above	139	46.3
	Yes	300	100
	No	0	0

The sample size for this study is 300. The demographic profiles of the questionnaire respondents are shown in Table 1. Female respondents make up 60.6% of the total number of respondents (182), while male respondents make up 39.3% (118). The biggest age group of respondents is 30-39 years old, with 137 respondents (45.7%), while the smallest age group is 50 and above years old, with only 8 respondents (2.7%). Most of the respondents work in the private sectors (47.3%), followed by those from public sectors (18.3%), freelancers (18%), and unemployed (14.6%). Almost half of the respondents (47%) are in the income bracket of RM2000 to RM3999. The highest range of frequency in purchased products in E-Commerce per month is more than 9 times, represented by 139 respondents (46.3%), while the lowest range is less than 3 times per month, represented by 4 respondents (1.4%). Finally, all respondents in this study have indicated that they have experience in online purchasing of fresh agricultural products.

B. Reliability Analysis

The reliability analysis has been conducted using Cronbach's Alpha via the 6 constructs. The Cronbach's Alpha value fall between 0.7 to 0.8 are considered good reliability while the value fall between 0.8 to 1.0 are considered very good reliability. Table 2 presents the value of Cronbach's Alpha for each construct.

TABLE II
RELIABILITY ANALYSIS

Constructs	Cronbach's Alpha	Strength of Association
Product Quality	0.769	Good
Logistic Service Quality	0.766	Good
Perceived Price & Value	0.799	Good
Platform Design Quality	0.884	Very Good
Platform Security	0.815	Very Good
Purchase Intention	0.873	Very Good

C. Inferential Analysis

The inferential analysis conducted in this study is Pearson correlation analysis and multiple linear regression. Pearson Correlation Coefficient has been used to measure the

relationship between independent variables (product quality, logistic service quality, perceived price & value, platform design quality, and platform security) and the independent variable (purchase intention). The correlation value for all five independent variables ranged positively between 0.301 and 0.834, with a significant level of 0.000. Based on the results shown in Table 3, all the independent variables have positive correlation with purchase intention, which are product quality ($r = 0.834, p = <0.01$), logistic service quality ($r = 0.638, p = <0.01$), perceived price & value ($r = 0.301, p = <0.01$), platform design quality ($r = 0.499, p = <0.01$) and platform security ($r = 0.597, p = <0.01$). The product quality had the highest positive correlation with purchase intention and the lowest is perceived price & value. Table 4 presents the result of Pearson Correlation Analysis.

TABLE III
PEARSON CORRELATION ANALYSIS

Purchase Intention	Product Quality	Logistic Service Quality	Perceived Price & Value	Platform Design Quality	Platform Security
Pearson Correlation	0.834	0.638	0.301	0.499	0.597
P-Value	0.000	0.000	0.000	0.000	0.000

The standardized beta coefficient compares the strength of each individual independent variable to the dependent variable. Based on Table 4, the standardized coefficients showed that the beta of product quality (0.805) is the most significant factor that influences the purchase intention; followed by platform security with beta 0.621; platform design quality with beta 0.451; logistic service quality with beta of 0.324 and perceived price & value is the last and least important factor with beta 0.157. Table 5 presents the findings on hypothesis testing.

TABLE IV
COEFFICIENTS

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta, β		
1 (Constant)	0.295	0.208		4.748	0.000
Product Quality	0.801	0.054	0.805	5.089	0.000
Logistic Service Quality	0.209	0.041	0.624	2.435	0.000
Perceived Price & Value	0.098	0.053	0.157	1.457	0.046
Platform Design Quality	0.375	0.056	0.451	4.651	0.000
Platform Security	0.679	0.063	0.621	5.684	0.006

TABLE V
MAJOR FINDINGS ON HYPOTHESIS TESTING

No.	Hypothesis	Significant Level	Conclusion
H1	Product quality has a positive impact on the consumer purchase intention on AE.	$\beta = 0.805$ $p = 0.000 < 0.05$	Supported
H2	Logistic service quality has a positive impact on the	$\beta = 0.624$ $p = 0.000 < 0.05$	Supported

No.	Hypothesis	Significant Level	Conclusion
H3	consumer purchase intention on AE. Perceived price & value has a positive impact on the consumer purchase intention on AE.	$\beta = 0.157$ $p = 0.046 < 0.05$	Supported
H4	Platform design quality has a positive impact on the consumer purchase intention on AE.	$\beta = 0.451$ $p = 0.000 < 0.05$	Supported
H5	Platform security has a positive impact on the consumer purchase intention on AE.	$\beta = 0.621$ $p = 0.006 < 0.05$	Supported

1) *Relationship Between Product Quality and Purchase Intention:* Table 5 shows the p-value of product quality ($p = 0.000$) is lower than the significant level of 0.05 with a positive β -value of 0.805. Thus, a positive relationship exists between product quality and purchase intention. This could be explained in which Malaysians who bought on AE are highly concerned with the quality and freshness of agricultural products.

2) *Relationship Between Logistic Service Quality and Purchase Intention:* It was found that the p-value of logistic service quality ($p = 0.000$) is lower than the significant level of 0.05 with a positive β -value of 0.624. Thus, logistic service quality and purchase intention have a significant positive relationship. This could be explained as Malaysians who bought on AE are moderately concerned about the services provided by the logistics.

3) *Relationship Between Perceived Price & Value and Purchase Intention:* The finding shows the p-value of perceived price & value ($p = 0.046$) is lower than the significant level of 0.05 with a positive β -value of 0.157. Thus, a positively significant relationship exists between perceived price and value and purchase intention. This could be explained as Malaysians who bought on AE have low concerns about the prices of agricultural products.

4) *Relationship Between Platform Design Quality and Purchase Intention:* Table 5 shows the p-value of platform design quality ($p = 0.000$) is lower than the significant level of 0.05 with a positive β -value of 0.451. Thus, a positive relationship exists between platform design quality and purchase intention. This could be explained as Malaysians who bought AE are moderately concerned about the design and layout of AE.

5) *Relationship Between Platform Security and Purchase Intention:* Table 5 shows the p-value of platform security ($p = 0.006$) is lower than the significant level of 0.05 with a positive β -value of 0.621. Thus, platform security and purchase intention have a significant positive relationship. This could be explained as Malaysians who bought on AE are moderately concerned about the security gateway provided in AE.

Previous research carried out by Gao concluded product quality needs to be improved [30]. Although his result showed

product quality has a significant relationship in affecting consumer behaviors or purchase intention in China, the result is not as significant as compared to Malaysia. The reason is that Malaysians are extremely concerned about the product quality as it is too common for Malaysians to seek good quality products, and it has become a standard for Malaysians. The living environment can further prove this, and livelihood in Malaysia is better due to the capacity and size of the nation.

IV. CONCLUSION

The project aims to investigate the factors influencing the adoption of AE from the perspective of consumers. The findings meet the research goals in which all the independent variables positively associate with the dependent variable, and product quality is the most significant predictor in that regard. Finally, this paper discusses the implication as well as future research recommendations. This research article could be used as a starting point for further research on AE in Malaysia. The findings from this research can provide insights to marketers and organizations involved in AE to enhance the implications of AE business in Malaysia.

In this study, product quality is found to significantly affect Malaysians' purchase intention on agricultural products through E-Commerce platforms. Consumers are not willing to purchase through AE without good quality and fresh agricultural products. Product quality is not just referred to the quality of the agricultural product during the packing of the parcel, but it is eventually referring to the quality of the agricultural products when consumers receive the parcels. Hence, this also led to logistic service quality being ranked as the second significant factor in this study. Timeliness is important, especially for agricultural products that have low durability, such as seafood and meat. Hence, enhancing logistic quality will allow the quality of products to be maintained, increasing customer satisfaction. This could retain the customer to shop on AE. Hence, it is recommended for marketers to enhance logistic quality as it assures in maintaining product quality.

From another perspective, platform security and platform design quality, which ranked third and fourth, are related to the technology and effort of AE providers in continuously attaining and providing safety and attraction to the consumers. Even though both factors are not highly significant, they are capabilities and abilities from the perception of digital technology. Lastly, Malaysians who purchased on AE are willing to pay for the prices if the AE could be retained through product quality, logistic service quality, platform design quality, and platform security.

Future researchers are encouraged to invite agricultural product producers or suppliers such as farmers and agromart business owners as one of data contributors. They could represent the "supply" as the current study investigates the consumer from the "demand" perspective. Aside from this, future studies could investigate urban farming solutions such as indoor hydroponic and aquaponic in producing quality products. These farming solutions can integrate with technology solutions, leveraging the farm and establishing within the cities [34]. It could be one of the solutions in retaining the product quality and maintaining the services provided by the logistic partner as the process for within-city delivery could be shortened.

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