Consumers' behavior analysis of vegetable e-commerce using the Technology Acceptance Model (TAM) approach in Jabodetabek

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Abstract. Vegetable e-commerce is a vegetable shopping tool that provides convenience and comfort, especially during the COVID-19 pandemic. People do not need to leave their homes to meet their needs so they can avoid exposure to the Covid-19 virus. This study aims to determine the behavior of using e-commerce vegetables in Jabodetabek through perceived ease of use, perceived usefulness, and attitudes, formulate managerial implications and marketing strategies to increase consumers repurchase intentions. This study uses the Technology Acceptance Model (TAM) approach and the Structural Equation Modeling (SEM) test with LISREL. The results showed that perceived usefulness and attitude were significantly influenced by perceived ease of use; perceived benefits have no significant effect on repurchase intention, but perceived benefits have a significant effect on attitudes; and consumers' intention to make repeat purchases are directly influenced by attitudes. The managerial implication that vegetable entrepreneurs can do is to continue implementing strategies that can increase positive attitudes toward consumers so that vegetable e-commerce is easier to use and provides benefits according to consumer expectations. The 4C approach (co-creation, currency, communal activation, and conversation) can be applied to develop positive consumer attitudes.

1 Introduction

Various changes in the behavior of human life happened because of the covid-19 pandemic. Both in terms of production, distribution, demand, and consumption patterns, and buying habits for food products. One crucial thing is consumers changing behavior in terms of how to shop. Most people worldwide make purchases of vegetables conventionally (offline). After the phenomenon of the covid-19 pandemic, the behavior of consumers shopping for vegetables entered a new era, namely through online shopping. How to shop vegetables online began to be widely chosen because it can reduce the risk of exposure to the covid-19 virus. People no longer need to jostle to get food and vegetable products. The large number of internet users in Indonesia, which reached 196.7 million people (73.7%) of the total

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Indonesian population of 266.91 million people, has encouraged changes in online vegetable shopping habits. This number increased by 25.5 million (8.9%) compared to 2018 [1]

Aday [2] presents some interesting findings. First, according to a demographic social survey conducted by the Central Statistics Agency, 9 out of 10 respondents conduct online shopping activities to comply with the recommendations of staying at home or working from home. It was stated that 31% of respondents experienced an increase in online shopping frequency, 28% decreased, and the rest remained. Online shopping activities are mostly carried out by female millennial respondents. Second, there was an increase in the demand for basic necessities by up to 50% during the Covid-19 pandemic and reported from Statistics Indonesia as many as 46% of respondents experienced an increase in the intensity of online shopping to buy groceries during April 2020. Third, the COVID-19 pandemic increases public awareness to consume healthier foods covered with fruits and vegetables to boost immunity.

FAO stated that with restrictions on the movement of people and goods due to the COVID-19 pandemic, input supply, labor availability, and sales of agricultural and food products were disrupted [3]. Lockdowns due to illness or travel restrictions greatly affect the supply chain of goods and services due to the absence of local or migrant workers [3]. Severe disruptions occurred in several sectors, such as food crop production, horticulture, and livestock which were relatively labor intensive due to labor shortages due to the COVID-19 crisis [4]. Logistical system bottlenecks disrupt food supply chains to further deplete high-value goods such as fruits and vegetables due to their short shelf life [3]. In addition, changes in demand will also lead to changes in material or packaging design, shipping options, and storage conditions [5].

Based on the results of a survey conducted by Redseer and reported by Katadata.co.id [6] stated that 51% of respondents claim to have first used e-commerce applications to shop during Large-Scale Social Restrictions (PSBB). The large use of e-commerce applications for shopping resulted in shopping transactions of horticultural products in e-commerce increasing 2 to 5 times compared to the period before the pandemic [6]. Sales through e-commerce increased by US $ 2.4 billion or up 26% from the monthly average in the second quarter of 2019. The number of daily transactions also increased to 4.8 million transactions in April 2019, or an increase of 1.7 million transactions from the achievement in the second quarter of 2019 of 3.1 million transactions. The covid-19 pandemic managed to increase online sales of agricultural commodities by almost 400% [7].

Study results [3] show that the impact of the COVID-19 pandemic is the disruption of market access of agricultural products, especially for small farmers, to the market. The effect is that urban consumer communities have difficulty accessing fruit and vegetable products, milk, meat, and fish in fresh form. Thus, an online market strategy is a strategic need for producers, commercial actors, and consumers.

The covid-19 pandemic has increased the trend of online shopping. This is reinforced by research conducted by [8] which shows that most people who shop for vegetables through e-commerce began during the covid-19 pandemic. However, there are still many people who do not want to try it. It can be seen from the results of a survey conducted by [9] of 100 respondents in Jabodetabek in July 2020 obtained information that there are 82% of respondents are aware of the existence of online vegetable shopping applications, but only 20% of the total respondents who have tried it. Excessive concern about product quality when buying certain types of food products online, such as meat, fruits, vegetables, and other fresh goods causes many respondents to have not tried them [10].

The level of vegetable consumption in DKI Jakarta province increased by 14.10% to 55 kg/capita/year in 2018 compared to the achievement in 2013 of 48.2 kg/capita/year [11]. It indicates that people in DKI Jakarta have paid more attention to health aspects related to

vegetable consumption. Meanwhile, the provinces of West Java and Banten experienced the opposite condition. Vegetable consumption levels in both provinces have declined. The amount of vegetable consumption of West Java people in 2018 amounted to 48.9 kg/capita/year or decreased by 4.3% compared to the achievement of 2013 of 51.1 kg/capita/year. Banten's vegetable consumption rate in 2018 amounted to 51.1 kg/capita/year or a decrease of 14.54% compared to the achievement in 2013 of 59.8 kg/capita/year.

In line with the increasing trend of purchasing vegetable products using e-commerce, the low percentage of people who have tried to shop for vegetables online, the decrease in vegetable consumption in West Java and Banten provinces, and the increase in vegetable consumption in DKI Jakarta, it is essential to research the analysis of consumer behavior of vegetable e-commerce use. The Technology Acceptance Model (TAM) approach in Jakarta Bogor, Depok, Tangerang, and Bekasi (Jabodetabek) is carried out to answer the problems faced by consumers in online shopping.

Given this context, the study's formulation of the problem is as follows: (1) How do consumers behave when buying vegetables through online shopping platforms; (2) How does perceived ease of use affect perceived usefulness; (3) How perceived ease of use and perceived usefulness effect on attitude; (4) How the perceived usefulness and attitude influence on vegetable repurchase intentions using online shopping; and (5) How the managerial implications that businesses can apply in increasing vegetable repurchase intentions through e-commerce.

The research's goals are to: (1) Discover how people in Jabodetabek behave when buying vegetables online; (2) Test the relationship between perceived ease of use and perceived usefulness; (3) Test the impact of perceived ease of use and perceived usefulness on attitude; (4) Test the impact of perceived usefulness and attitude on vegetable repurchase using online shopping; and (5) Formulate managerial suggestions that businesses can use to increase vegetable sales.

2 Research Methods

The foundations used to develop the analytical framework are Theory of Reasoned Action (TRA) and Technology Acceptance Model (TAM). Research on perceived ease of use, perceived usefulness, attitudes, and consumer intentions to repurchase is still very limited to olericulture commodities. Previous research on TAM in the e-commerce segment conducted by [12] only focused on modern technology that affects the frequency of use of e-commerce websites. The use of information and communication technology as the Technology Acceptance Model (TAM) of mobile banking has been the subject of several other research. [13] found at least four benefits of e-commerce for the agricultural sector: reducing transaction costs, intermediation, infrastructure providers for companies, and expanding internal business processes. Furthermore, [14] emphasized that e-commerce becomes an actor in facilitating sellers and buyers through online marketing systems.

This research will enrich the wealth of knowledge regarding consumer intentions in repurchasing vegetable products through e-commerce. Knowledge of consumers repurchase interest will be useful for vegetable businesses that market their products using e-commerce as one of the library sources that can be used for corporate decision-making. This study also benefits to analyzing the behavior of using e-commerce vegetables with the Technology Acceptance Model (TAM) approach, especially for academics and researchers who studied it.

The study was conducted from March 2021 to May 2021. The major data for this study came from survey findings using an online questionnaire issued via the WhatsApp app. The questionnaire took the form of a google form. 153 respondents—individual sellers—who

had purchased veggies through e-commerce made up the sample for this study. E-commerce that is an individual seller is an e-commerce that sells vegetables using its brand (not a marketplace). The scale used is a Likert scale with sampling techniques using convenience sampling. Measuring instrument validity tests use product moments, and questionnaire reliability tests using Cronbach Alpha.

2.1 Hypothesis

The perceived ease of use of a system has a significant positive effect on perceived usefulness based on research conducted by [15]. The perceived ease of use and perceived usefulness simultaneously affect spike acceptance according to the results of [16]. If technology is easy to use and useful, the positive attitude of its users will improve. The usefulness or benefits felt by users can increase the intention to repurchase or use technology. The results of [17] stated that the perceived ease of use positively affects purchase intentions. This study covers perceived usefulness, perceived ease of use, attitudes, and repurchase intentions. Based on the description above, the study seeks to prove some of the hypotheses summarized in the frame of mind model as Figure 1.
H1: Perceived ease of use affects perceived usefulness.
H2: Perceived ease of use affects attitude.
H3: Perceived usefulness affects attitude.
H4: Perceived usefulness affects repurchase intentions.
H5: Attitude affects repurchase intentions.

2.2 Conceptual Framework

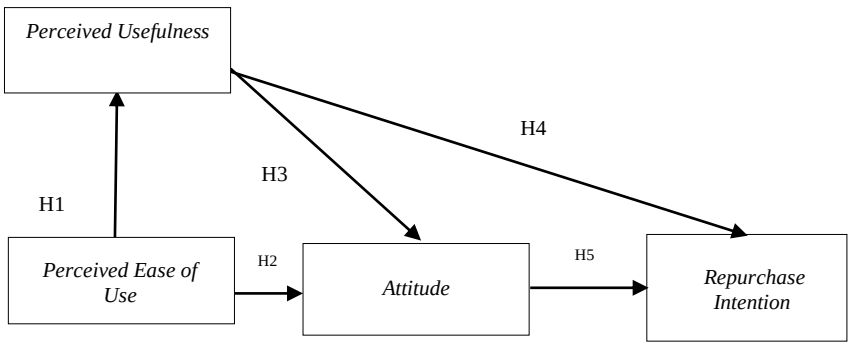

Fig. 1. Conceptual framework of thought

3 Result and Discussion

3.1 Characteristics of consumers

Millennials (those aged between 27 and 40 years) make up most respondents, amounting to 69.28 percent of all respondents. Followed by female respondents as many as 73.86 percent, married respondents as much as 75.82 percent, most of the undergraduate respondents as much as 55.56 percent, private employees as much as 22.22 percent. Respondents with incomes between Rp. 7 million and Rp. 14 million reached 33.99 percent of respondents. About once or twice every month, the majority of respondents buy

vegetables online. This shows that vegetable e-commerce is still in the process of being introduced to the Jabodetabek community. It didn't take long to change behavior, in this case, how to shop for vegetables.

The use of e-commerce for agricultural products has its constraints, especially for fresh products of high economic value, such as fruits, vegetables, eggs, meat, and fish. The results of the [18] and [19] study revealed that the lack of professional human resource capacity, efficient marketing systems, high logistics costs, and inadequate infrastructure are significant obstacles in participating in e-commerce. [20] identified several challenges to e-commerce adoption in Indonesia: slow internet connection, limited internet access, especially in remote areas, difficulties in banking access, and goods delivery problems.

3.2 Analysis of structural equation modelling model Lisrel

3.2.1 Outer Model Evaluation

The validity and reliability of the model can be measured by evaluating the outer model. This analysis describes the relationship between latent variables and their indicators and defines how each relates to its latent variables [21]. Convergent validity test, average variance extracted (AVE), and construct reliability (CR) were used in this method.

3.2.2 Convergent Validity

If the observed variable has a Standardized Loading Factor (SLF) > 0.70 and a T-value of 1.96 or almost 2, it is considered to have good validity [22]. The loading factor value employed in this investigation is > 0.7. Three variable indications in the results of the initial test—PU1 (0.51), A6 (0.62), and RI4 (0.50) have loading factor values that are less than 0.7, necessitating their elimination and a new test. All indicators have a loading factor value of > 0.7 following retesting, meeting the convergent validity model.

3.2.3 Reliability Test

To evaluate the accuracy and consistency of indicators used to indicate latent constructs, reliability testing is done. Two metrics are used in reliability assessment: Average Variance Extract (AVE) and Construct Reliability (CR). The average extracted value (AVE) must be less than or equal to 0.5. According to [23], CR values between 0.90 and 0.90 imply high dependability, 0.70 to 0.90 suggest high reliability, 0.5 to 0.7 indicate moderate reliability, and 0.5 indicate low reliability. Table 1 below shows the reliability test results from this investigation:

Table 1. Reliability Test Results

Latent Variable	**Indicator Variable**	**Reliability Test**		**Description**
		VE≥0.5	CR≥0.7	
Perceived ease of use	PEU1-PEU3	0.635	0.839	Reliable
Perceived usefulness	PU2-PU4	0.625	0.833	Reliable
Attitude	A1-A5	0.616	0.889	Reliable
Repurchase intention	RI1-RI3	0.599	0.817	Reliable

3.2.4 Analysis of Inner Models (Structural Models)

The inner or structural model analysis aims to analyze the level of estimation between free variables against bound variables. The R-square value indicates the determination of exogenous variables to their endogenous. Based on data processing, R-square results such

as those shown in Table 2 and the indicator's contribution to latent variables are displayed in Table 3 as follows:

Table 2. R-square VALUE SEM Results

Latent Variable	R-Square Value
Perceived usefulness	0.35
Attitude	0.75
Repurchase intention	0.76

3.3 Indicator Contribution to Latent Variables

Table 3. Indicator Contribution

Construct	Code	Indicator	Loading factor	T-count	Desc.
Perceived ease of use	PEU1	How to shop through e-commerce is easy to understand.	0.83	11.53*	Valid
	PEU2	Shopping for vegetables online requires less effort than offline.	0.79	10.81*	Valid
	PEU3	Skillfully using e-commerce applications is easy for me.	0.77	10.52*	Valid
Perceived usefulness	PU2	The price of vegetables sold online through e-commerce is quite competitive when compared to vegetables sold in conventional markets.	0.74		Valid
	PU3	I can save a lot of time when shopping for vegetables through e-commerce.	0.82	9.69*	Valid
	PU4	It has more flexibility to do shopping using e-commerce.	0.81	9.57*	Valid
Attitude	A1	The quality of vegetables sold through e-commerce is better than those sold in traditional markets.	0.79		Valid
	A2	The services provided by e-commerce in shopping for vegetables are superior to conventional vegetable purchasing services.	0.73	11.23*	Valid
	A3	I often use information technology to shop for vegetables through e-commerce.	0.83	11.27*	Valid
	A4	Using technology to shop for vegetables is easy and fun.	0.84	11.29*	Valid
	A5	I'm looking for information on how to buy vegetables online.	0.73	8.39*	Valid
Repurchase intention	RI1	I am interested in repurchased vegetables through e-commerce.	0.75		Valid
	RI2	I will advise others to buy vegetables through my preferred e-commerce.	0.75	12.87*	Valid
	RI3	Buying vegetables through e-commerce is preferred more than shopping at traditional markets.	0.82	9.39*	Valid

This study used the analysis of path coefficient values and t-calculated values of structural models for hypothesis testing. A variable is said to have a significant effect if the t-count $\geq$ 1.96. Conversely, variables have no significant effect if the t-count $\leq$ 1.96. The results of hypothesis testing obtained in this study are displayed in Table 4 below:

Table 4. Hypothesis test results

Path	**Path Coefficient**	**T-count ≥ 1.96**	**Conclusion**
Perceived ease of use --> Perceived usefulness	0.59	6.04*	Significant (Receive H1)
Perceived ease of use --> Attitude	0.20	2.33*	Significant (Receive H1)
Perceived usefulness --> Attitude	0.74	6.75*	Significant (Receive H1)
Perceived usefulness --> Repurchase intention	0.15	0.92	Not Significant (Reject H1)
Attitude --> Repurchase intention	0.74	4.13*	Significant (Receive H1)

Description: *) Significant on t-count ≥ 1.96

With a path factor of 0.59 and a t-count of 6.04, perceived usability considerably and favorably influences perceived usefulness. This suggests the same conclusion as the research of [8], namely that perceived usefulness increases with perceived ease of use. The findings of this study are in line with those of a study conducted by [24], which found that a system's perceived utility and simplicity of use both have a significant beneficial impact.

A path coefficient of 0.20 and a t-count of 2.33 indicate a significant direct relationship between perceived ease of use and attitude. This finding is consistent with [25], which found that patient acceptability of the online registration system at Fatmawati Hospital is influenced by its usability. The findings of this study demonstrate that a system's ability to facilitate good consumer attitudes increases with ease of use.

With a path coefficient of 0.83 and a t-count of 5.32, perceived usefulness has a favorable and significant impact on attitude. It is consistent with the findings of research by [26] which demonstrates that perceived usefulness has a favorable and significant influence on attitudes. Customers' positive attitudes will rise the more valuable vegetable e-commerce is perceived to be by them.

Repurchase intentions are positively but insignificantly influenced by perceived usefulness. The findings do not support other studies' findings that perceived usefulness influences repurchase intention in a favorable and significant way [24]. The findings of this study are consistent with those of [27]. They claimed that the intention to use online banking services is unaffected by perceived usefulness. Through attitude, perceived usefulness influences repurchase intentions. This is the case because attitude greatly affects attitude, which in turn greatly affects intents to repurchase.

In keeping with other studies showing that attitudes positively affect repurchase intentions, attitude has a positive and significant impact on intentions to repurchase [28]. These findings suggest that consumers are more likely to make subsequent purchases when they have a favorable mindset.

4 Conclusions and suggestions

4.1 Conclusions

In this study, the results that directly influence repurchase intentions (repurchase intention) is attitude. Therefore, the managerial implications that vegetable entrepreneurs can do in e-commerce to increase buying intentions include continuing to carry out strategies that can improve the positive attitude of consumers. To improve the positive attitude of consumers, marketing strategies that can be done are improving the user interface and user experience, marketing through the community, making prices more affordable, discount promos with vouchers and free shipping, and involving consumers in the development of e-commerce.

By involving consumers in the development of e-commerce, companies can obtain accurate information related to products that consumers want that are not yet available in e-commerce today. It also allows the company to create custom products according to consumer tastes.

4.2 Suggestions

Further research should add other variables that are thought to affect the behavior of vegetable e-commerce use in addition to the variables that have been used in this study, such as perceived risk variables. The scope of the area taken can be expanded not only in Jabodetabek, considering that vegetable e-commerce is currently expanding to many cities in Indonesia, such as Surabaya and Bandung. Interviews directly with respondents and e-commerce parties can also be done to get a more complete and thorough understanding of the behavior of using vegetable e-commerce.

Limitations in this study are the limitations of data retrieval time that is relatively short, namely within one month. This is because data collection starts in March 2021 to mid-April 2021. Data collection does not continue until the end of the month because, in mid-April 2021, it has started to enter the month of Ramadan. Researchers are worried that data collection in the month of Ramadan does not provide an overview of the actual online purchases of vegetable products made by customers.

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