The Future of Mobile Commerce Application in a Post Pandemic Period; An Integrative Model of UTAUT2

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Abstract. The massive adoption of mobile commerce during the COVID-19 period has become the only way for consumers to sustain their consumption. However, as we enter the endemic phase, the continuity of this modern shopping mode is still questionable, whether consumers continue to use it or discontinue it. To address this issue, we integrate the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) and Self-Determination Theory (SDT) to empirically predict the antecedents of consumers' continuous usage of m-commerce in a post COVID-19 setting. Through an online survey, primary data was collected from 202 consumers in Indonesia who had at least twice purchased via an m-commerce application in the last six months. The data was then analyzed using a variance-based structural equation modeling technique (SEM-PLS). The results showed that all nine identified constructs from UTAUT2 (performance expectancy, effort expectancy, social influence, hedonic motivation, habit) and SDT (autonomy, competence, relatedness) had a positive and significant impact on the continuous usage intention of m-commerce among Indonesian users and affirm prior research findings as well. Furthermore, habit was found to be the strongest predictor of influencing consumer behavior towards m-commerce applications. This finding provides further enrichment to the theory based on the integrated UTAUT2 and SDT models. Practically, the current results are essential to marketing strategies as they add novel insights pertaining to consumers' expenditure through m-commerce apps during post-COVID-19 in emerging markets.

1. Introduction

It is generally believed that the post-COVID-19 world will continue to evolve and create more adjustments than consumers have already absorbed and become accustomed to in the last two years [1]. Given the unpredictable nature of the behaviour, mobile e-commerce keeps increasing in popularity as it delivers a more memorable customer experience, multiple payment methods, and round-the-clock accessibility, in addition to its tremendous growth potential [2]. M-commerce technology offers customers wide access to a significant range of products from the comfort and safety of their homes, and has allowed the company to

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continue operating despite contact restrictions and other confinement measures. In its developement, m-commerce adoption has exceeded expectations, along with the emergence of whole new lifestyles, preferences, priorities, and purchase decision-making patterns. After COVID-19, the scenario would be intriguing as consumers begin to take precautions or risks by shifting their daily consumption to m-commerce platform. However, the future – like the continuous usage – is always been unpredictable. According to the Qualtrics global survey in 2021, although the majority of consumers are becoming less unworried about the pandemic, they still have a tendency to return to their previous normal behavior, for example, returning to conventional or brick-and-mortar shopping modes [3]. From this point on, the continuity of m-commerce usage is arguably requestionable.

Several previous empirical studies have examined the relationship between COVID-19 and m-commerce technology acceptance behavior in a variety of settings, including business, social media, travel, hospitality and tourism, financial technology, m-learning, and m-health [1,4,5]. Additionally, m-commerce has been widely embraced as a risk mitigation in worldwide scale, such as South Korea, United States, and Europe [6]. Unfortunately, the usage of m-commerce in this current endemic phase have not been extensively explored, specifically in Indonesia, which has the fourth-highest number of Internet users in the world. In-depth research into this phenomenon may yield new knowledge and contribute significantly to the advancement of the theory of technological acceptance. Hence, the purpose of this article is to analyze the antecedents of customers' continuous usage of m-commerce applications during the endemic phase.

This study advances our knowledge of the current application of the Unified Theory of Acceptance and Use of Technology (UTAUT) in its modified form, UTAUT2, which encompasses "performance expectations, effort expectations, social influences, facilitating conditions, hedonic motivations, and habits" [7,8]. Considering that numerous scholars have recommended some potential integration or modification of user acceptance model with other grand theories [9], we then propose Self-Determination Theory (SDT). SDT elucidates in the context of human-computer interaction that users can become autonomous when their demands for competence, connection, and autonomy are fulfilled [10,11]. In contrast to prior studies that only focused on the pandemic situation, we attempt to present an original contribution by analyzing the post-COVID-19 impact on mobile purchase behavior and consumers' continuous usage intentions grounded on the theoretical framework of UTAUT2. The results will not only contribute to UTAUT2 enrichment, but also give practical insights about the how to benefit from the future of m-commerce apps in endemic period.

2. Literature Review And Hyphotheses Development

Unified Theory Acceptance and Use of Technology (UTAUT) is basically defined as a model to explain or predict user behavior towards information and communication technology computer or device. It is universally acknowledged that UTAUT has become the most prevalent theoretical model, frequently adapted for the acceptance of technology or information systems due to its predictive power on behavior [7,12]. Venkatesh et al. [7] proved that the UTAUT model consists of eight well-established theories, namely: Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), Motivational Model (MM), Theory of Planned Behavior (TPB), Combined TAM and TPB (C-TAM TPB), Model of Personal Computer Utilization (MPCU), Diffusion of Innovation (DOI), and Social Cognitive Theory (SCT). The theory then evolves into UTAUT2 and generated new seven inclusive dimensions: performance expectations, effort expectations, social influence, facilitation conditions, hedonic motivation, price values, and habits [8]. UTAUT2 adoption is aimed at being a useful tool for managers who need to figure out how likely it is that new technologies will work. It will help them figure out what makes people accept something

new, so they can plan interventions (like training, marketing, etc.) for users who may be less likely to adopt and use the new system [13].

Numerous prior studies have probed or modified UTAUT2 in diverse settings. For example, a cross-sectional study examined the determinants of health and fitness application use among potential users in South Korea [14]; the intention to use contact-tracing mobile applications in Thailand [4]; the application of m-learning in higher education activities in Ghana [15]; and the use of mobile applications for shopping in several countries [5,16–18]. Several prior studies have stressed the significance of sustainable use for a online business in the long term [2,19]. Nevertheles, we found that each of UTAUT2 construct from the aforementioned prior studies have a distinct result and the lack of adaptation of this essential UTAUT2 framework creates empirical gaps so that further analysis is necessary to address this issue. Hence, we modified usage intention into continuous usage intention to empirically predict the outcome of m-commerce behavior in a post COVID-19 age. Therefore, the UTAUT2 hypotheses are collectively formulated as follows:

H1-H5 : There is a positive and significant influence between UTAUT2 constructs (performance expectancy, effort expectancy, social influence, hedonic motivation, and habit) and the continuous usage intention of m-commerce applications.

Self-Determination Theory (SDT) shows that people are motivated to grow and change under the influence of three innate and universal psychological needs, namely autonomy, competence, and relatedness [20)]. The concept of intrinsic motivation, or engaging in activities for the inherent rewards of the behavior itself, plays an important role in SDT theory. Research shows that having a high degree of self-determination can drive success in many different areas of life [20]. Moreover, it has been applied to predict human attitude on various fields, such as education, employment, sports, and health [20,21]. However, how motivation affects technology acceptance is still under-investigated. Hence, we presumed that there would be correlational impact between SDT determinants towards continuous usage intention of m-commerce technology. Thus, we hypothesize:

H6-H8 : There is a positive and significant influence between SDT constructs (autonomy, competence, relatedness) and the continuous usage intention of m-commerce applications.

3. Methods

The purpose of this paper is to explore buyers' continuous usage intentions (CUI) to purchase products or services through m-commerce applications during the COVID-19 endemic phase. On the basis of the UTAUT2 and SDT theories, nine predictor variables have been identified: PE, EE, SI, HM, HAB, PA, PC, and PR. To answer this research objective, a conceptual framework was developed as the basis for the quantitative approach. The presumption under investigation is then implemented utilizing a scale derived from prior research and taken into consideration for the current research context.

The population of this study focused mainly on all Indonesian customers who used m-commerce applications to purchase goods and services during the endemic period. Accordingly, the researcher selected the Tokopedia m-commerce service as a transaction platform because multiple reports indicated a significant increase in shopping activities in 2022. Purposive sampling, also known as judgmental, selective, or subjective sampling, was utilized because the exact number could not be quantified [22]. In order to collect accurate primary data, the following criteria for potential respondents have been established: (1) active users of the Tokopedia m-commerce application; and (2) active Tokopedia users who have completed at least two transactions in 2022. This judgment is critical for obtaining a sample representative of the research question.

Data collection involves an online survey, which utilizes the Google Form feature to produce an electronic questionnaire. A link is generated and then distributed massively

through the most popular social media platforms in Indonesia (Whatsapp and Facebook). During 2 months (January and February 2022), the total responses received in the e-form database reached 330 answers. However, there were 128 responses that were rejected in the verification process. Thus, the number of responses specified as a sample is 202 active Tokopedia users. The data was then tested using the PLS-SEM analysis tool.

Nine latent constructs which consist of 3 items were assessed. The instrument from UTAUT2 theory, namely, performance expectancy, effort expectancy, social influence, hedonic motivation and habit were modified and adapted from various prior research [8,23]. The SDT (autonomy, competence, relatedness) items were adapted from [15,21]. Measurement for continuous usage intention were referred to [24]. All of the items were rated on a five-point Likert scale, from 1 ("strongly disagree") to 5 ("strongly agree"). The detailed operational definitions of each measurement and their outer model assesment are presented in Table 1.

4. Results And Discussion

Descriptive statistics reveal that the majority of Tokopedia m-commerce customers included in this study actively used this app during the epidemic (last 2 years). In terms of demographics, the sample was dominated by men (64.3%), those between the ages of 17 and 23 (74.2%), and those enrolled in one or more Indonesian institutions (69.3%). Meanwhile, respondents' most favored Tokopedia good or service is clothing (85.1 percent). This background provides marketing experts with crucial fundamental knowledge they can utilize to develop plans for enhancing m-commerce application technology in unexpected situations.

In PLS-SEM-based testing, hypothesis testing is carried out by performing a bootstrapping process with the help of the smartPLS 3.0 computer software program so that the relationship between the effects of exogenous variables on endogenous variables is obtained [25]. The t-table cut-off value for 95% confidence level (5%) and degrees of freedom (df) = n-2; 202-2= 200 is 1.98. Table 2 shows the results of the hypothesis tests for each relationship between latent variables.

Table 1. Constructs and Measures, Confirmatory Factor Analysis, and Convergent Validity

Constructs	Item Measurements	Loadings	AVE	C.R.	C.A.
Performance Expectancy (PE)	PE1 – I find m-commerce app useful to support my daily life	0.718	0.552	0.924	0.840
	PE2 – Using m-commerce app increases my productivity	0.743			
	PE3 – Using m-commerce app helps me accomplish things more quickly	0.740			
Effort Expectancy (EE)	EE1 – It will be easy to get accustomed to use the m-commerce app	0.845	0.559	0.889	0.803
	EE2 – It will be convenience to use the m-commerce app well	0.733			
	EE3 – My interaction with the m-commerce app will be clear and understandable.	0.844			
Social Influence	SI1 – people who are important to me encorage me to use m-	0.855	0.612	0.804	0.799

(SI)	commerce app				
	SI2 – People who are important to me think m-commerce app are beneficial	0.822			
	SI3 – People who are important to me think it is a good idea to use m-commerce app	0.864			
Hedonic Motivation (HM)	HM1 – Using m-commerce app is fun	0.709	0.561	0.807	0.878
	HM2 – Using m-commerce app is enjoyable	0.849			
	HM3 – Using m-commerce is very entertaining	0.772			
Habit (HAB)	HAB1 – Using m-commerce app has become natural to me	0.874	0.577	0.842	0.864
	HAB2 – I am in favour of using m-commerce app	0.809			
	HAB3 – I feel the need to use m-commerce app as a new mode of shopping	0.702			
Perceived Autonomy (PA)	PA1 – If I had the choice to buy, I would choose m-commerce app	0.707	0.545	0.858	0.877
	PA1 – I feel free to make my own shopping in m-commerce app	0.764			
	PA1 – I can decide which products to buy in m-commerce app	0.750			
Perceived Competence (PC)	PC1 – I believe I am good in using m-commerce app	0.784	0.605	0.803	0.837
	PC2 – I feel pretty confident when using m-commerce app	0.722			
	PC3 – I am satisfied with my ability to purchase via m-commerce app	0.745			
Perceived Relatedness (PR)	PR1 – I can trust other consumers comments or reviews in m-commerce app	0.754	0.521	0.859	0.806
	PR2 – I can trust others consumers ratings in m-commerce app	0.779			
	PR3 – I would like a chance to interact with other consumers in m-commerce app	0.730			
Continuous Usage Intention (CUI)	CUI1 – I will keep using the m-commerce app in the future	0.714	0.543	0.817	0.913
	CUI2 – I will maintain my use frequency on m-commerce app in the future	0.709			
	CUI3 – I will recommend the m-commerce app to others	0.780			

Notes: *AVE: Average Variance Extracted; CR: Composite Reliability; CA: Cronbach Alpha*
PLS Valid and Reliable Cut-off value: AVE > 0.5; Loadings Factor; CR and CA > 0.7

Table 2. Boostrapping result of PLS-SEM

H	Direct Effect	β	Std. Error	T-value	P-value	Decision
H1	PE → CUI	0.298	0.085	3.506	0.001	**Supported**
H2	EE → CUI	0.305	0.097	3.144	0.002	**Supported**
H3	SI → CUI	0.275	0.102	2.696	0.008	**Supported**
H4	HM → CUI	0.339	0.099	3.424	0.001	**Supported**
H5	HAB → CUI	0.387	0.089	4.348	0.000	**Supported**
H6	PA → CUI	0.301	0.092	3.272	0.001	**Supported**
H7	PC → CUI	0.257	0.087	2.954	0.004	**Supported**
H8	PR → CUI	0.314	0.096	3.271	0.001	**Supported**

Note: CUI: Continuous Usage Intention; CPE: Performance Expectancy; EE: Effort Expectancy; SI: Social Influence; HM: Hedonic Motivation; HAB: Habit; PA: Perceived Autonomy; PC; Perceived Competence; PR: Perceived Relatedness
Significance: $p < 0.05$ and T-stats > 1.98

This study aims to investigate the underlying factors that influence the continued use of m-commerce applications (Tokopedia) among young consumers in Indonesia. The UTAUT2 theory and SDT were integrated to establish the research framework. The test results indicate that the three SDT constructs (PA, PC, and PR) and five UTAUT2 constructs (PE, EE, SI, HM, and HAB) are significant for promoting m-commerce in Indonesia. The findings of this study confirm earlier findings from other contexts.

These findings suggest that consumers will be willing to accept Tokopedia m-commerce since they demand it to fulfill their online buying needs and wants. This mobile application's capabilities are also incredibly provide ease of use and flexibility access, which makes it easier to find relevant product information. Additionally, clients truly love using mobile commerce because of the wide range of goods and services that sellers offer, ranging from necessities (such as household or gaming needs) to more specialized items. Furthermore, encouragement from significant others like family or close friends boosts their confidence and, at the same time, solidifies their decision to use mobile commerce in the future. The dominant effect of consumers' continuing use of mobile commerce is habit. This is reasoanable, since they have been used to doing business online during COVID-19 and are reluctant to switch to a different platform.

Customers are more motivated to continue using mobile commerce because they feel that they have more freedom to choose the goods or services they want to purchase. This is highly backed by the functionality or speed of the Tokopedia application, the quality of which has been ensured. In order to determine whether m-commerce will continue to be used in the future, customers must be knowledgeable about all application capabilities. Customers who are unfamiliar with using this technology won't feel happy and will likely revert to more traditional transaction methods. Due to the lack of a customer chat function, users of the program do not yet perceive a strong sense of social connection. Consumers believe that they need this kind of interaction to make their shopping plans more certain, and m-commerce businesses should make this possible.

5. Conculusion

The research model for m-commerce tests eight hypotheses based on the integration of the UTAUT2 and SDT theoretical frameworks. The results of this study prove that the UTAUT2 and SDT components have been shown to be significant predictors of continued use of m-commerce during the COVID-19 endemic period. Thus, one of the most notable conceptual contributions is that he enriches the earlier theory of UTAUT2. From a practical point of view, due to technological advances, widespread use of mobile communication devices, and changing customer behavior, m-commerce has become popular in recent years, especially compared to online sales and/or e-commerce. This changing pattern of customer behavior has prompted marketers to advance their marketing strategies in m-commerce settings, thereby modernizing and adapting offerings to new social contexts. As key ways to deal with the new m-commerce landscape, companies can focus on giving customers a seamless experience, improving customer trust and satisfaction, and coming up with relevant customer analytics.

The theoretical limitations of this paper relate to the constructs included in the model, which are based on UTAUT2 and SDT. The proposed model can be expanded with potential variables, such as trust, satisfaction, and/or customer loyalty to m-commerce applications. In addition, since this study offers a broad perspective on m-commerce applications from different product categories, future research could focus on different product categories, m-commerce applications, or specific mobile vendors. In addition, this cross-sectional study reflects a limited data set collected from m-shopper Tokopedia Indonesia. Thus, future research is needed to confirm these concepts in various research contexts and situations.

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