The Relationship of Trust, Product Attractiveness, and Technology Features Towards the Technology Acceptance Model in the Case of Vending Machine

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ABSTRACT

Technology has influenced businesses in various ways by providing a tool for businesses to develop their activities further. In the retail industry, one of the technology developments is business automation through software integration, enabling retail stores to become fully automated, providing convenience for their customers. The most well-known retail automation is vending machines with applications in retail that have been used in many countries for selling food and beverages. However, in Indonesia, the development of vending machines is still considered low. Scholars argue that such low development is due to people's ignorance on how to use the system. This study makes an attempt to examine this low utilization of vending machines for selling food and beverages by looking at the external factors, such as product attractiveness, technology features, and trust towards the Technology Acceptance Model (TAM). The study was conducted based on a total of 220 respondents in the Greater Jakarta area. The result of this research confirms that technology features have the most significant relationship with the acceptance of vending machines for selling food and beverages in Indonesia; while trust has a positive partial relationship with TAM.

Keywords: Vending Machine, Product Attractiveness, Trust, Technology Features, TAM, Perceived Usefulness, Perceived Ease of Use, Intention to Use, Actual Usage

1. INTRODUCTION

The rapid development of technology has affected the business community, enabling them to become more efficient, cost minimization, betterment in their customer services, and to develop new business models [1]. The development of technology influences various industries, including the retail industry, by converting conventional retail into digital retail, commonly known as e-commerce.

The transformation of conventional retail into digital retail is due to business automation. Business automation is a stand-alone kiosk operating fully automatically through software integration [2]. The most well-known business automation is vending machines. Vending machines are automated systems that sell everyday essentials, i.e. food and beverages [3].

Vending machines are not a new technology. The first vending machine was introduced in the 19th centuries for stamps and postcards, and since then, the utilization of the vending machine has been used until today, especially in developed countries. In developing countries such as Indonesia, vending machines are mostly used in the transportation sector to sell tickets and cold beverages. However, the development of vending machines for food and beverages in Indonesia is still considered low due to people's ignorance on how to use the vending machine system [4], despite the Indonesian consumption of prepared food and beverages reaching 39.42% of their monthly expenditure [5], where most of those food and beverages are commonly sold in supermarket, kiosk, and vending machine [3]. However, the utilization of vending machines in Indonesia is much lower compared to Singapore, and Japan [6] .

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1 Literature Review

2.1.1 Technology Acceptance Model

The Technology Acceptance Model was first introduced by Fred D. Davis, Jr in 1985 [7]. Davis developed the new theory focusing on technology acceptance known as the Technology Acceptance Model (TAM). TAM focuses on a corporation investment in technology and evaluates if such technology would actually help organizations to enhance their business process following such technology investment, TAM looks at the users' or consumers' overall attitude towards the acceptance of the technology system based on the predicted actual use of technology (affective response) from the users' or consumers' cognitive response (perceived usefulness, and perceived ease of use) towards such technology. Two major cognitive response determinants in TAM are Perceived Ease of Use (PEOU) and Perceived Usefulness (PU) in which PEOU has a causal effect on PU [7].

PEOU and PU have a direct relationship to the external factors that have effect on the acceptance to the technology (Davis, 1985). Davis considered PU and PEOU as mediating variables of external factors and users' affective response, predicting the users' attitude towards technology systems with the behavioral response represented by actual system use referred to as the user's actual usage of a system [7] TAM was developed with two (2) objectives. First, it is to explore the extent of understanding of the technology acceptance process in information system (IS) technology. Second, TAM is aimed to provide a theoretical basis for system designers and implementers to develop a successful IS design and implementation. Thus, it enables system designers and implementers to evaluate the new system prior to the implementation or introduction [7].

The cognitive response of TAM PU is defined as "the degree to which an individual believes that using a particular technology system could enhance his or her job performance"[7]. Prior research of TAM has shown that perceived usefulness is a strong determinant of user acceptance, adoption, and usage behavior [8], [9],[10]. Gefen (2003) argues that the importance of PU in a new technology adoption is because of the extrinsic aspects captured through PU.

Davis, [7] defined PEOU as "the degree in which an individual believes that using a particular system would be free of physical and mental efforts". PEOU with intrinsic aspects is believed to have an important role [11]. For initial acceptance of an innovation, PEOU is a critical determinant which is essential for adoption and continued use of technology [12]. King & He [13], in an internet-related product, indicated that PEOU is much more important than PU. PEOU has been examined extensively in understanding user acceptance of technology, similarly with PU. Further, [14], [15] in their studies showed that PEOU is a critical component in affecting the adoption process. Yousafzai [16] also suggests that PEOU could improve attitude toward adoption of technology regardless of the product's usefulness [16].

2.1.2 External Factors in TAM

External factors of TAM are considered as the design features (Davis, 1985) which is derived from the Theory of Reasoned Action (TRA) [17]. Generally, TRA focuses on behavioral volatility and subjective norms as the antecedents of an individual's positive perception and believe to perform a new behavior. The first external factor added to TAM by Davis [12] was output quality. [18] divided the external factors into four categories which are organizational characteristics, system characteristics, user's personal characteristics, and other variables. Based on those categories of external factors of TAM, this research selects trust as a user's personal characteristics, technology features as system characteristics, and product attractiveness as other variables related to products offered through the technology.

Technology features are defined as components of a group of software that affect the performance of the system [19]. Wu & Chen [20] investigated the technology features in Massive Open Online Courses (MOOCs) relation towards TAM, and showed the importance of technology features as antecedents of technology acceptance. Ahn [21]investigated the online and offline features of internet shopping malls and concluded that information quality, service quality, system quality, and products quality were significant in correlation with the acceptance of internet shopping mall

McKinght [22] defined trust as a belief which allows customers as the end user to become vulnerable to web retailers. Similarly with vending machines, the consumers must make the payment first and later the systems will work [3]. However, in some cases after the payment has been made, the system had problems, making the system not working or not fulfilling the trust of consumers [23], [24]. Further, Pavlou [25] indicated that trust is attributed to human relationships with complex technologies due to the involvement of high uncertainties in complex technology.

Trust has been regarded as a catalyst for buyer-seller transactions that can provide consumer's high expectations of satisfying exchange relationships. Many researchers maintain trust as an essential aspect to

understand the interpersonal behavior and economic exchanges [10], [22], [25]. Product attractiveness refers to the products being sold inside the vending machine or by the technology, such as prepared food and beverages product, finished goods product, cigarettes, etc. Product attractiveness is the degree in which the consumer perceptions influence the response of a product whether to approach or avoid the product [26].

Schnurr [26] stated that factors such as aesthetic aspects and brand familiarity are important aspects of a user's behavioral intention. Previous studies have examined the relation of product attractiveness as the factors influencing the behavioral intention in various contexts has strengthened the importance of product attractiveness especially in the retail automation [27], [28], [29].

2.2 Hypothesis Development

2.2.1 Technology Features, Perceived Usefulness and Perceived Ease of Use

Previous studies have shown the significant impact of system features towards TAM [12], [21]. By providing such a system that is required by the users, the system is much more efficient and easy to use, and leads to the acceptance of the technology [12], [21], [30]. Having good and efficient technology features makes a vending machine system much easier to operate and more functionally. Based on such inferences on technology features in relationship to TAM, this study advances the following hypotheses:

Hypothesis 1. Technology features has a positive influence towards perceived usefulness

Hypothesis 2. Technology features has a positive influence towards perceived ease of use

2.2.2 Trust, Perceived Usefulness and Perceived Ease of Use

The uncertainties in retail automation occur while consumers purchase a product and complete the transaction whether or not the products or services are as expected by the consumers [22]. By trusting the technology system, users will have an inclination to accept the technology. Based on such inferences on trust in relationship to TAM, this study advances following hypotheses:

Hypothesis 3. Trust has a positive influence towards perceived usefulness

Hypothesis 4. Trust has a positive influence towards perceived ease of use

2.2.3 Product Attractiveness, Perceived Usefulness and Perceived Ease of Use

Previous studies have shown product attractiveness influenced the behavioral intention to behavioral intention [26], [31]–[33].It is predicted that attractive products sold inside the vending machine will stimulate the acceptance of vending machine. Based on such inferences on trust in relationship to TAM, this study advances following hypotheses:

Hypothesis 5. Product attractiveness has a positive relationship towards the perceived usefulness of vending machine technology

Hypothesis 6. Product attractiveness has a positive relationship towards the perceived ease of use of vending machine technology

2.2.4 Perceived Usefulness, Perceived Ease of Use, Intention to Use

Davis [7] argued that intention reflects the individual's decision formed by a process of mental deliberation Both PU and PEOU constructs also influence the affective response of a technology acceptance, known as the intention to use the technology (IUT). Based on such relationship among PEOU, PU and IUT in TAM, this study advances the following hypotheses:

Hypothesis 7. Perceived usefulness has a positive influence towards the intention to use technology.

Hypothesis 8. Perceived usefulness has a positive influence towards perceived ease of use.

Hypothesis 9. Perceived Ease of Use has a positive influence towards the intention to use of technology.

2.2.5 Intention to Use and Actual Usage of Technology

Davis, [7] stated that behavioral response is the highest stage of technology acceptance. However, a previous study stated that TAM has failed to predict the actual usage of an IS [34]. Therefore, in this research, with high intention to use vending machines, it is predicted that people will use vending machines.

Hypothesis 10. Intention to use has a positive relationship towards the actual usage of vending machine

3. RESEARCH METHODOLOGY

3.1 Sample and Procedure

A total of 188 respondents participated in this research. Proceeding to the data screening and cleansing, 22 respondents are eliminated. Resulting 166 valid respondents. The survey was distributed online (e.g. via email and social media platforms). By gender, the respondents are dominated by males with 51%, aged

18 – 27 years old with 67%. 59% have bachelor degrees, and 68% use private transportation for their daily activities. The average monthly expenditure for the 27% respondents spent Rp 3,000,000 – Rp 5,000,000. -.

3.2 Measures

All the measurements used in this study are adopted from previous studies. Technology Features (TF) was measured with 16 measurements items adopted from Ahn [21] consisting of four dimensions – System Quality (TFSY), Information Quality (TFI), Product Quality (TFP), and Service Quality (TFS). Product Attractiveness (PA) was measured with 8 measurements items with three dimensions – Product Aesthetic (PAA) was adapted from Etim, (2019), Product Usability (PAU) was adapted from Schnurr [26], Promotion attractiveness (PAP) was adapted from Santini [29]. Trust measured with 6 measurement items adapted from Maqableh [35] . For the measurement items of TAM, it is adapted from Davis, 1985 with PU measured using 4 measurements, PEOU with 4 measurements, IUT with 2 measurements, and AUT with 3 measurements.

All 7 constructs are measured using a five-point Likert scale ranging from "1" as "strongly disagree" and "5" as "strongly agree". As mentioned, this study performed Brislin's back-translation method, converting all the measurement items from English into Indonesian. The study also conducted pilot test and focus group discussion (FGD) to ensure the validity of the measurements item.

4. RESULTS

4.1. Descriptive Analysis, Validity, and Reliability Testing

The descriptive analysis was examined through SPSS version 26, and for hypothesis testing structural equation modeling (SEM) LISREL version 8.8 was used. The test is analyzed by examining the standardized factor loading (SLF $\geq$ 0.50), T-Value ($\geq$ 1.96), Construct Reliability (CR $\geq$ 0.7), Variance Extracted (VE $\geq$ 0.5, and Cronbach's Alpha ($\geq$ 0.70). All the cut off values are according to [36]. The

Table 1. Result of Structural Model Fit Indices

$(X^2)/df$	1.391
df	238
(X^2)	331.06
RMSEA	0.051
SRMR	0.061
GFI	0.86
CFI	0.99
NFI	0.96
NNFI	0.99
IFI	0.99

structural model fit indices are assessed by goodness of fit model. The descriptive statistics are displayed in Table 2. Table 3 displays the result of correlation of the constructs. The result of hypothesis testing is shown in Table 4, indicating there are 4 hypotheses that are not supported, which are the relationship between PA to PEOU and PU, PEOU to IUT, and T to PU.

5. DISCUSSION

The study showed that technology features have positive relationships with PU and PEOU. Such findings confirm the study by Ahn [21] in which they examined the system quality, information quality, product quality, and service quality in online shopping retail stores. Hence, in technology-related retail, technology features play an important aspect influencing the perception of acceptance of technology. Trust as the external factors of TAM, has a positive influence towards PEOU, supporting a previous study by Pavlou [25] indicating that trust is an essential aspect to understanding interpersonal behavior and economic exchanges between users and the respective technology.

However, the hypotheses regarding the positive relationship between Trust and PU is not supported in this research. This finding supported the arguments from Hoffman [37] stating such relationship is not established due to the consumers' perception of not believing the system provides a secure transaction and not really needing such a system. The development of the

Table 2. Correlation test results

Constructs	PU	PEOU	IUT	AUT	T	PA	TF
PU	1						
PEOU	.514**	1					
IUT	.638**	.422**	1				
AUT	.203**	.183*	.212**	1			
T	.489**	.445**	.428**	0.140	1		
PA	.321**	.282**	.401**	.156*	.497**	1	
TF	.563**	.518**	.568**	.295**	.547**	.569**	1

** indicates significant correlation at the level 0.01 level (2tailed)

Table 3. Correlation test results

Constructs	Mean	SD	Min	Max	CR	VE	Cronbach's Alpha
PU	3.97	0.81	1.50	5.00	0.853	0.594	0.843
PEOU	3.90	0.70	2.00	5.00	0.813	0.525	0.805
IUT	3.80	0.76	1.00	5.00	0.779	0.656	0.749
AUT	2.90	0.61	2.00	5.00	0.754	0.505	0.755
T	3.80	0.67	2.00	5.00	0.800	0.512	0.754
TF	4.10	0.69	1.50	5.00	0.946	0.880	0.832
PA	4.02	0.78	2.00	5.00	0.892	0.764	0.846

Table 4. Hypothesis Testing Results

	Hypotheses	SFL	T-Value	Conclusion
H1	TF has a positive relationship towards PU	0.25	3.6	Supported
H2	TF has a positive relationship towards PEOU	0.28	3.44	Supported
H3	T has a positive relationship towards PU	0.15	3.35	Not Supported
H4	T has a positive relationship towards PEOU	0.42	3.6	Supported
H5	PA has a positive relationship towards PU	0.11	1.27	Not Supported
H6	PA has a positive relationship towards PEOU	0.1	1.05	Not Supported
H7	PU has a positive relationship towards PEOU	0.4	3.66	Supported
H8	PU has a positive relationship towards IUT	0.83	3.66	Supported
H9	PEOU has a positive relationship towards IUT	0.1	0.92	Not Supported
H10	IUT has a positive relationship towards AUT	0.8	6.36	Supported

transactional system through financial technology payment systems might increase the trust of vending machines, since Indonesians are likely to adopt mobile payment systems [38] which provide a more secure, easy, and reliable transactional system [39]. This infers that the role of the vending machine is easily replaced with other means of buying a product. The findings of this research have shown that the user's affective response as IUT mainly correlates with the PU of the vending machine, indicating the perception of vending machines is a time effective and efficient technology has proven by this study supporting the study of vending machines in Indonesia [10]. However, the positive relationship of PEOU and IUT is not supported in this research.

This infers, the respondents have difficulties to adapt, and use a vending machine, also supporting the arguments from Mulyani & Hartono [4] who stated that many Indonesians do not know how to use the vending machine. This study also supports the results from [40] who stated the ease of use technology platform does not correlate or relate to the user's intention to use the system in online-retail context. The result of this study also supports the casual relationship of perceived usefulness and perceived ease of use [7] by positive correlation for both user's cognitive responses. The positive relationship of intention to use and actual usage also supporting the research's hypothesis. This indicates people that have the intention to use vending machines are actually using the system, supporting the results of [10].

The findings of this research contributes to theory in several ways. First, for vending machine technology, perceived usefulness is an important determinant of acceptance in technology. It confirms arguments that perceived usefulness' relation with intention to use is profound (King & He, 2006). Secondly, the hypothesis on a direct relationship of perceived ease of use and intention is not supported in this study. Such findings could be in line with the study of King & He, (2006) stating that to examine such relationships requires larger samples. Hence, this study infers that 166-sample data is not large enough to examine effectively the relationship of PEOU and IUT.

TAM predicts the actual usage of technology by using intention to use as the influencing factors. This study answered the argument from Turner [34] whether TAM predicts the actual usage of technology by indicating there is a positive relationship between IUT and AUT. Furthermore, the hypothesis on the relationships between product attractiveness and TAM are not supported. Such findings confirm research done by Kim [27] indicating no relationship between product attractiveness with the TAM model.

The practical/ managerial contributions of this study confirm that technology features of a technology play an important aspect for the acceptance of such technology. Hence, such finding is important for vending machine designers to pay attention to the technology features built in the vending machine to ensure the utilization of vending machines. In addition, vending machine designers could also consider developing vending machines that not only sell beverages, but also other products in order to increase the usefulness and development of vending machine technology.

6. CONCLUSION

This research confirms that Technology Features play an important external factor in determining the perception of consumer acceptance or rejection of a technology. Technology features address the system and features of the vending machine that are critical factors in forming the users' acceptance perception towards vending machines. Product attractiveness as an external factor to the TAM model appears to be not an important factor in driving the acceptance of technology (in this case vending machines). Users of vending machines put more weight on technology features compared to the other external factors when they decide to accept and use the vending machine technology.

There are some limitations of this study. First, this study is a cross-sectional study that cannot determine the causality between variables studied. Second, the research context is limited to vending machine technology in Indonesia, of which the result might be different in other types of technology. This study also focuses on respondents who live in the Greater Jakarta area which might not represent Indonesia as a whole, or other countries. Hence, future research could examine the relationships among the variables in longitudinal studies to establish the causality in different contexts of technology and other countries.

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