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Tools for Measuring Factors Influencing User's Continuance Intention towards Community-Based Traffic and Navigation App in Indonesia

Rafiqah Khairunnisa[1], Indrawati[2]

[1,2]Telkom University, School of Business and Economics, Bandung, Indonesia

Abstract: ***Indonesia is the fourth country with the largest population in the world within over 256 million people living across the region. The population growth rate of 3 million per year in Indonesia has been successfully making Indonesia become an overpopulated country, which also followed by its positive and negative effects to consider. For the negative side, mobility problem is one of the concerning matter. One of the simple examples of mobility problem is traffic congestion. Nowadays, six cities in Indonesia has included into the list of The 100 Most Congested Cities in the World. The internet penetration in Indonesia is growing rapidly day by day and the internet users is dominated by Smartphone/Personal Tablet users, which is more than 44% of total users. It directly affects the growth of application downloads. To solve the traffic congestion, people are trying to use traffic and navigation applications,hence the rate of downloading traffic and navigation applications increases. One of the most popular navigation application in Indonesia is Waze. Waze is the biggest community-based traffic and navigation application and is in the 2nd position as the most downloaded navigation application in Indonesia.In 2014, Indonesian Waze users has become the top 10 biggest Waze users in the World also in 2017, Jakarta holds the title as the 2nd biggest Waze users in ASEAN.The growth of Waze in Indonesia is quite significant form year to year, it reached over 750.000 active users in 2013, and in 2015 the number had increased consistently until it reached over 1.5 Million active users and now Waze in 2018 has reached over 4 million active users who use the application at least twice a day.By the successful growth of Waze in Indonesia, it is necessary to analyze factors influencing the continuance intention of Waze users in adoptiong Waze application. This study is intended to test the measurement tool using the Modified Unified Theory of Acceptance and Use of Technology 2 Model from Venkatesh et. al., (2012). The modification was done by adding 'Content' variable. In testing the measurement of this study, data from 30 respondents are used and analysed by using SPSS software. The result revealed that the measurement model consisted of 9 variables and 43 items have fulfilled the validity and reliability requirements. Therefore, this measurement can be used for the further study.***

Keywords: Mobility, Adoption, Waze, Modified UTAUT2, Indonesia

1. Introduction

Indonesia is the fourth largerst country in the world after China, India and United States. According to Spectator Index, Indonesia has over 256 million people living all across the region. Indonesia is predicted reaching its peak in 2062 with 324,76 million people[1].

According to factsofindonesia.com, with a population growth rate of 3 million per year, Indonesia has been successfully become the overpopulated country. Being an overpopulated country has its negative effects, including; a quite cornerning amount of employment which is 6,87 million people, high level of poverty and also a very bad mobility problem[2].

One of the simple example of mobility problem is a traffic congestion. According to brookings.edu [3], rising traffic congestion is an inescapable condition in large and growing metropolitan areas across the world.That statement in fact is currently happening in Indonesia's metropolitan cities.Six cities in Indonesia is on the list of The 100 Most Congested Cities in the World and Indonesia is placed 2nd of top 3 cities with the most congested traffic in the world based on the INRIX Research in 2017.

Based on the survey result done by Indonesian internet service provider association (*Asosiasi Penyelenggara Jasa Internet Indonesia*—APJII, 2017), the internet users peneteration in Indonesia is 143,26 Million people from the total population of 262 Million people, this means the internet users in Indonesia is more than a half of the population existed, which is around 55%. The internet users in Indonesia is dominated by Smartphone/Personal Tablet users, which is around 45% of total users [4]. With a high of smartphone/Personal Tablet users in Indonesia, it directly affect the growth of application downloaded.

To solve the traffic congestion, internet users also seek the problem solver through applications, that is why the emergency of downloading traffic and navigation applications increase. One of the most popular navigation applications downloaded in Indonesia is Waze. In fact when Waze was claimed by Google in 2013, the application has grown rapidly ever since. According to Tribuntechno, Waze is in the 2nd position as the most downloaded navigation application in Indonesia which is 5,6% downloads. [5]

Waze is the biggest community-based traffic and navigation app. It can contribute to provide traffic information and accidents that occur on the road. Compared to other navigating apps, Waze is a driving focused navigation so it fits for those who has a vehicle or a passanger of the vehicle to use Waze for the easier mobility. Waze offers some cool features, also Waze recommends user to go to alternative roads so user can save time and it is updated every seconds depend on the current situation of the road.

Indonesian Waze users have become the top 10 biggest Waze users in the World in 2014 [6]. Fully aware of the benefit of Waze, Principal Governance of DKI Jakarta has coorperate with Waze since 2014 to build the smart city and Intellegent Traffic System (ITS) [7].Waze also has done

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several projects to maximize its function in Indonesia, such as partnering with PT. Pertamina (Persero) [8] and some broadcasters such as TV broadcaster [9].

In 2017, Jakarta holds the title as the 2nd biggest Waze users in ASEAN [10]. Globally, Waze now has over 100 Million active users from 185 countries across the globe. Country Manager Waze Indonesia stated, in Indonesia the growth of Waze is quite significant form year to year, it reached over 750.000 active users back in 2013, and in 2015 the number had increased consistently until it reached over 1.5 Million active users and in 2018 Waze has reached over 4 million active users who use the application at least twice a day [11].

Waze has 50 communities that are actively volunteering and once a year Waze organizes community gatherings for these communities and Waze targets 4,1 Million users in Indonesia. For now, Waze is focused on continuing to add the user downloader.This year Waze focused on quick service restaurants (QSR), automotive and fuel. Waze is also planned to be penetrated in other industries such as banking or FMCG (fast moving consumer goods). [9]

By the successful growth of Waze in Indonesia, Waze needs to realize factors that can influence the continueance usage of Waze application itself. Therefore, it is necessary for the authors to identify the variables and indicators that are taken into the consideration as the factors influencing the continuance intention in adopting Waze in Indonesia. As the result, the company could do an improvement and other business could take some ideas to be applied to their products.

Based on The Unified Theory of Acceptance and Use of Technology (UTAUT) 2 Model from Venkatesh et. al., (2012) [12], this study proposed a new modified model that has not been tested yet to analyze factors influencing continuance intention of Waze adoption in Indonesia. Thus, the objective of this research is to propose measurement tools test the model.

2. Literature Review

Unified Theory of Acceptance and Use of Technology (UTAUT) 2 Model

In order to achieve the objective as described in the introduction, the authors conducted the literature review of the theories from the previous studies and models related to user adoption of technology-based service. UTAUT 2 model is the most suitable to be used as the theoretical framework of this study but the authors modified the theory of UTAUT 2 model by Venkatesh et al., (2012) and added a new variable. UTAUT 2 model is developed from eight models; Theory of Reasoned Action (TRA), Theory of Planned Behaviour (TPB), Technology of Acceptance Model (TAM), Technology of Acceptance Model 2 (TAM2), Combined TAM and TPB (C-TAM-TPB), Motivational Model (MM), Innovation Diffusion Theory (IDT) and Social Cognitive Theory (SCT) [12]. Compared to the eight previous models, which could only predict 17%-53% of the variation, UTAUT has a capability to explain 56%-74% of variation on behavioral intention towards the use of technology. UTAUT was conducted for organizational or company context so because the authors want to predict the continuance intention of Waze adoption in consumer context, this research is using UTAUT2 to give the more fitted variables to the framework model for consumer or individual context [12].The additional variables in the UTAUT2 model are; Hedonic, Price Value and Habit, while the moderating variables are; Age, Gender and Experience. Moreover, many researchers already used UTAUT2 for their research model, including; Indrawati&Marheani (2015) about Predicting Instant Messenger Application Adoption Using A Unified Theory Of Acceptance and Use of Technology 2 [13], Gupta et. al., (2017) studied the Tourist Adoption of Mapping Apps using UTAUT2 Perspective [14] and lastly, Xu (2014) applied UTAUT 2 to study of online gamers users [15].

The authors modified the framework model of UTAUT 2 based on the need of this study. This study wants to predict the factors influencing Waze users to continuously adopting Waze so the authors adapt Behavioral Intention with continuance Intention. Moreover, the respondents of this study are those who already use Waze for more than 3 months because the study aims is to find out what factors influence the active users to continuously using Waze. Xu (2014) also used Continuance Intention for the study of users' continued use of online games. [15]

This study adding Content as the new variable to the model of UTAUT2, thus, it becomes the modified UTAUT 2 Model. In this research, Content is predicted to be affecting the continaunce intention Waze users in adopting Waze continuously. Indrawati et. al., (2010) studied about 3G mobile multimedia service (MMS) utilization [16]and found out Content is the most significant variable that influence the adoption of 3GMM. Indrawati & Haryoto (2015) also added Content to the modified UTAUT 2 model for predicting prospective users' intention adoption toward TV streaming [17] and the result is content the most influential variable compared to other variables.

UTAUT 2 developed by Venkateshet. al., (2012) used three moderating variables; Age, Gender and Experience, however, because the type of this study is not a longitudinal study but cross-sectional study, so this study only use Age and Gender as its moderating variables. So, the modified UTAUT 2 Model of this study consist of 8 independent variables, 2 moderating variables and 1 dependent variable. the research framework of this study become like the figure 1 below:

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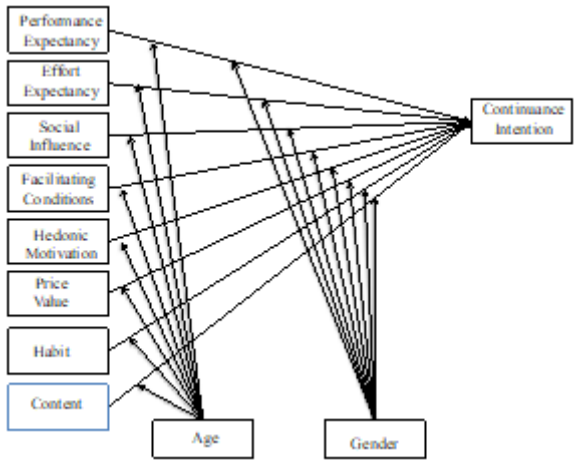

Figure 1: Conceptual Model adapted and modified by the authorsfrom UTAUT2 (Venkatesh et., al 2012)

The definition of each variable is based and adapted from Venkateshet. al., (2003 and 2012) [18,12]. The definition of each variable as follows: Performance Expectancy is defined as the degree to which an individual believes that using Waze application will help him or her to attain gains in job performances.Effort Expectancy is defined as the degree of ease associated with the use of Waze application.Social Influence is defined as the degree to which an individual perceives that important others believe he or she should use Waze application.Facilitating Conditions are defined as the degree to which an individual believes that an organizational and technical infrastructure exist to support use of Waze. Hedonic Motivation is defined as the fun derived from using Waze, and it has been shown to play an important role in determining technology acceptance and use.Price Value is consumers' cognitive tradeoff between the perceived benefits of Waze application and the monetary cost for using them.Habit defines as the extent to which people tend to use Waze application automatically because of learning.Adapted from Indrawatiet. al,. (2010) [16]Content defined as materials prepared by the practitioner or community that will be used by a large number of people, which are available and can be accessed by using Waze. The authors defined and adapted Behavioral Intention with Continuance Intention, thus, Continuance Intention is the key predictor of the continuance use of Waze and the degree to which a person plans to perform some specified behavior in the future.

3. Measurement Material

To test the proposed model of this study, the measurement material must be valid and reliable. In order to do that, first, the authors conducted a content validity. According to Indrawati (2017:49), to carry out and fulfill the criteria of content validity, the authors must adopt and modify the existing items from previous researches that have been published in reputable and accredited national or international journals [19]. Therefore, the questionnaire items for this research is adopted and modified from items in the previous studies. The items used is to measure the perception level of Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions, Hedonic Motivation, Price Value, Habit, Content and Continuance Intention from Waze Users in Indonesia.

The authors then met three experts in the field of marketing and digital technology to ask if there were any suggestions for the items in the questionnaire improvement so that it could be readable enough to be spread to the respondents. After getting the approval from the experts, the authors did a validity test, which is a readability test, to makes sure them items in the questionnaires is clear and do not make any confusion. The items of each variable are listed below in Table 1.

Table 1: Questionnaire Items

Item Code	Items of Performance Expectancy
PE1	I find Waze application useful in my daily driving.
PE2	Using Waze application helps me reach my destination conveniently.
PE3	Using Waze application save my time while driving.
PE4	Using Waze application helps me visit the places of my interest.
PE5	Waze application helps me to drive effectively.
Item Code	Items of Effort Expectancy
EE1	Learning how to use Waze application is easy for me.
EE2	Waze application is easy to understand.
EE3	I find Waze application easy to use.
EE4	It is easy for me to become skillful when using Waze application.
EE5	Overall, using Waze application is easy.
Item Code	Items of Social Influence
SI1	People who are important to me think that I should use Waze application while driving.
SI2	People who influence my behavior think that I should use Waze application while driving.
SI3	People whose opinions that I value prefer that I use Waze application.
SI4	People who are close to me are using Waze application.
SI5	People who familiar with me recommend me to use Waze application.
Item Code	Items of Facilitating Conditions
FC1	I have the knowledge necessary to use Waze application.
FC2	Waze application can be used in gadget(s) that I have.
FC3	I can get help from others when I have difficulties in using Waze application.
FC4	To get the information about the use of Waze application is very easy.
Item Code	Items of Hedonic Motivation
HM1	Using Waze applications is fun.
HM2	Using Waze application is enjoyable.
HM3	Using Waze application is very entertaining.
HM4	I feel excited in using Waze applicationlications
HM5	I feel pleased driving with Waze application.
Item Code	Items of Price Value
PV1	The cost of using Waze application is reasonable.
PV2	Using Waze application is worth the cost.
PV3	At the current price, Waze application provides a good value.
PV4	The benefits obtained from using Waze is comparable to the costs incurred.
Item Code	Items of Habit
H1	The use of Waze application has become a habit for me.
H2	I am addicted to use Waze application when driving.
H3	I must use Waze application when driving.
H4	the use of Waze application is a part of my daily driving.

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H5	To use of Waze application does not require a deep consideration.
Item Code	Items of Content
C1	Waze applications content: safety warning, digital information and entertainment meet my needs.
C2	Content that can be accessed via Waze application meet my needs.
C3	Content of Waze application give me a cozier feeling.
C4	Content that can be accessed via Waze application provide precise information that fits my needs.
C5	Content accessed through Waze application will stay up to date.
Item Code	Items of Continuance Intention
CI1	I intend to continue using Waze application rather than discontinue its use.
CI2	I will keep using Waze application as regularly as I do now.
CI3	My intention to continue using Waze applications than use any alternatives means.
CI4	I intend to increase my use of Waze application in the future.
CI5	I will strongly recommend others to use Waze application.

4. Method and Result

In order to test the validity construct of this research, the authors conducted a survey in the form of pilot test. 30 respondents were collected as the preliminary data for the pilot test. The authors processed the data by using IBM SPSS 23 to conduct the validity test using "Corrected Item – Total Correlation" (CITC) method. Friedenberg and Kapla in Indrawati (2015:149) suggested the correlation coefficient is minimum reached the level of ≥0.3 to be stated as valid [20]. This research used Aplha-Cronbach to measure the realibility level of each questionnaire item. Alpha-Cronbachcoefficients level minimally has to at least show ≥0.70 so that the questionnaire is said to have a fairly good level of reliability. (Hair et. al., 2010; Kaplan and Saccuzzo 1993: 126; Nunnally& Bernstein, 1994; Pedhazur&Pedhazur, 1991) in Indrawati (2015:155) [20]. The result of pilot test presented in Table 2.

Table 2: Questionnaire Items

Item Codes	CITC	CA	Item Codes	CITC	CA
PE1	0.668		PV1	0.78	
PE2	0.81		PV2	0.681	
PE3	0.639		PV3	0.694	
PE4	0.525		PV4	0.891	0.889
PE5	0.737	0.857	H1	0.679	
EE1	0.833		H2	0.835	
EE2	0.862		H3	0.794	
EE3	0.763		H4	0.806	
EE4	0.764		H5	0.725	0.906
EE5	0.826	0.926	C1	0.7	
SI1	0.392		C2	0.723	
SI2	0.611		C3	0.724	
SI3	0.73		C4	0.655	
SI4	0.755		C5	0.584	0.856
SI5	0.699	0.831	CI1	0.76	
FC1	0.504		CI2	0.806	
FC2	0.522		CI3	0.651	
FC3	0.562		CI4	0.677	
FC4	0.659	0.745	CI5	0.662	0.875
HM1	0.812	0.896			
HM2	0.767				
HM3	0.749				
HM4	0.802				
HM5	0.665				

Table 2 above shows that the result of pilot test revealed the measurements consisting of 43 items and 9 variables have fulfill the validity and reliability requirements.

5. Conclusion

The test of measurement model proposed for this study byusing 30 respondents of Waze userswho have been using Waze for at least 3 months, revealed that the measurement material that consists of 43 items and 9 variables are valid and reliable. Thus, this proposed measurement model could be used for the further study.

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Authors Profile

Rafiqah Khairunnisa, Telkom University, School of Business and Economics, Bandung, Indonesia

Indrawati, Telkom University, School of Business and Economics, Bandung, Indonesia

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