A Proposed Model for Measuring Instant Messenger Application Adoption
A Comparative Study between Indonesia and Malaysia Customers

Indrawati Indrawati, Maya Ariyanti
Telkom University
Indonesia
indrawati@telkomuniversity.ac.id, mayaariyanti@telkomuniversity.ac.id

ABSTRACT: *In Indonesia, the percentage of application downloaded is the second highest in South East Asia after Philippines, but the usage frequency is the lowest (40 minutes) among other countries. In Malaysia, the percentage of application downloaded is the lowest among comparing countries, but the usage frequency is the highest (66 minutes) among other countries. It is important to increase the usage of the application especially in Indonesia which is considered still low compare to Malaysia. In order to increase the usage, factors that influence the behavioral intention and use behavior of people to use the application is important to identify. The objective of this research are to identify and compare factors that affect the behavioral intention and usage behaviour toward instant messenger applications of Indonesians and Malaysian Customers. To acheive the objectives this research had done literature review of published articles which are mainly from international journal and interview and focus group dicussion in several cities in Indonesia with 97 customers and in Malaysia with 36 customers. The result of this process suggest that there are two new variables that should be added to the original UTAUT2 model, namely: interoperability and mobile friendlyness. Thus, this study proposed Performance Expectancy, Effort Expectancy, Social Influence, Facilitating condition, Hedonic Motivation, Price Value, Mobile Friendlyness, and Interoperability as dependent variables which will infuence the behavioural intention and use behavior of customers in Indonesia and Malaysia toward instant messenger applications. Age and gender as moderating variables.*

1. Introduction

The number of internet users in Indonesia has increased approximately 13% from 2012 until 2013. With total of 71,9 million users, internet penetration in Indonesia reaches 28% of total population (Sinaga, 2014). Most of users in Indonesia use smartphone as device to connect themselves to Internet. Smartphone usage in Indonesia is averagely 189 minutes per day. Some activities done by users with their smartphone are chatting (2,1 minutes), browsing (1,9 minutes), multimedia (1,1 minutes), game (1,1 minutes), social network (1,1 minutes), and Apps store (0,2 minutes) (Inilah 10 Aktivitas,2013). Chatting is the most frequently activities doby smartphone users, due to the increasing of new instant messenger applications available for smartphone, such as WhatsApp, Blackberry Messenger (BBM), LINE, KakaoTalk, and WeChat. Those applications has replaced the function of Short Messages Service (SMS) to some smart phone users. Total messages sent through instant messenger successfully get beyond total messages sent through SMS (Farabi, 2013). Furthermore, report from Flurry Analytics shows that the users of this application increases dramatically in 2013 which reaches 115% compared with previous years (Jagat Review.com, 2014).

A surveyby Mobile Marketing Association (MMA) and vserv.mobi to 3.000 mobile web and application user in six South East Asia countries: Indonesia, Malaysia, Philippines, Singapore, Thailand, and Vietnam reveals that the frequency of mobile content downloaded in Indonesia, especially for application categories is the second highest among others. Indonesia is the only country which has the number of downloaded application consistently above average of South East Asia, the other countries intend to fluctuate. The second highest number of application downloaded is not in line with the usage, which is Indonesia become the lowest among other South East Asia countries. This condition is not good for business, since application developers and companies usually get benefit from usage fee of the applications. The more the application is used the benefit the application developers and companies be. It is important to motivate customers to use the downloaded application in their activities.Identifying factors affecting the behavior intention and use behavior of customers toward instant messenger applications is needed, in order to motivate them to use the application.

Problem Statements, Research Question & Objectives

Based on the illustrations in the background, problem statements which are analyzed in this research are: the percentage of application downloaded by smartphone users in Indonesia is the second highest in South East Asia after Philippines, with instant messenger application as the most frequently downloaded application in 2013. But this fact is contradictive with total usage of that application by smartphone user in Indonesia, as shown above only 40 minutes per day. In Malaysia, the percentage of downloaded application is the lowest among comparing countries, but the usage frequency is the highest (66 minutes) among other countries. It is important to increase the usage of the application especially in Indonesia which is considered still low compare to Malaysia. In order to increase the usage, factors that influence the behavioual intention and use behaviour of people to use the application is important to identify. So far, the adoption and use behavior factors of instant messenger application are not yet well researched especially in the broad area of research interest such as in Indonesia and Malaysia.

To solve those problems, this study in the first half of the first year had to answer the following questions: 1. Based on literature review result what is the proposed model that should be used to measure the behavioral intention and use behavior of consumers in Indonesia and Malaysia toward using instant messenger application? 2. Based on interview and FGD result what is the proposed model that should be used to measure the behavioral intention and use behavior of consumers in Indonesia and Malaysia toward using instant messenger application? 3. What is the best fit model that should be used to measure the behavioral intention and use behavior of consumers in Indonesia and Malaysia toward using instant messenger application?

In line with the research questions, the objectives of this research are: 1.To find out the proposed model that should be used to measure the behavioral intention and use behavior of consumers in Indonesia and Malaysia toward using instant messenger application based on literature review result.2. To find out the proposed model that should be used to measure the behavioral intention and use behavior of consumers in Indonesia and Malaysia toward using instant messenger application based on interview and focus group discussion result. 3. To find out the best fit model that should be used to measure the behavioral intention and use behavior of consumers in Indonesia and Malaysia toward using instant messenger application.

To acheive the objectives this research had done literature review of published articles which are mainly from international journal and interview as well as focus group dicussion (FGD) with customers and in Indonesia and Malaysia.

Literature Review Result

In order to find the most fit model, this study first review the literature regarding the technology adoption theories or models. With the aim to improve our understanding of the factors may affect adoption intention from a consumer demand perspective. This study found 12 thoeries or models that usually used in the study of adoption of technology or services based on technology. The following twelve theories or models of technology adoption are: (1) the Theory of Reasoned Action (TRA), (2) the Theory of Planned Behaviour (TPB), (3) the Technology Acceptance Model (TAM), (4)Technology Acceptance Model 2 (TAM 2), (5) the Motivational Model (MM), (6) the Combined TAM-TPB (C-TAM-TPB), (7) the Model of Personal Computer Utilization (MPCU), (8) Innovation Diffusion Theory (IDT), (9) Social Cognitive Theory (SCT), (10) Extended SCT, (11) the Unified Theory of Acceptance and Use of Technology (UTAUT), and (12) the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2).

The last two models (UTAUT and UTAUT2) are considered to be good for predicting the behavioural intention of people

toward technology or services based on technology. UTAUT was initially developed by Venkatesh et al. in 2003 through a review and consolidation of the constructs of the eight previously mentioned theories employed to explain usage behaviour in the IT context (Al-Qeisi, 2009; Armida, 2008; Cameron, 2006; Moran, 2006; Niehaves & Plattfaut, 2010; Venkatesh et al., 2003; Wu et al., 2008). Venkatesh et al. (2003) empirically evaluated the eight models and their extensions in longitudinal field studies. The studies were conducted over a six-month period with three points of measurement at four organizations, among which individuals being introduced to a new technology in the workplace were selected. Based on the results, a model was formulated to integrate the important constructs of the eight earlier models into a unified model, which became the unified theory of acceptance and use of technology (UTAUT). The UTAUT posits that *performance expectancy*, *effort expectancy*, and *social influence* are the three key constructs which directly influence *behavioural intention* and that *facilitating conditions* is a key construct which directly influences *usage behaviour* (Al-Qeisi, 2009; Armida, 2008; Cameron, 2006; Moran, 2006; Niehaves & Plattfaut, 2010; Venkatesh et al., 2003; Wu et al., 2008). Besides these four key constructs, they propose that *age, gender, voluntariness of use*, and *experience* moderate the influence of the four key constructs on *behavioural intention* and *usage behaviour* (Al-Qeisi, 2009; Armida, 2008; Cameron, 2006; Moran, 2006; Niehaves & Plattfaut, 2010; Venkatesh et al., 2003; Wu et al., 2008). Figure 1 indicates the relationship among constructs in the UTAUT.
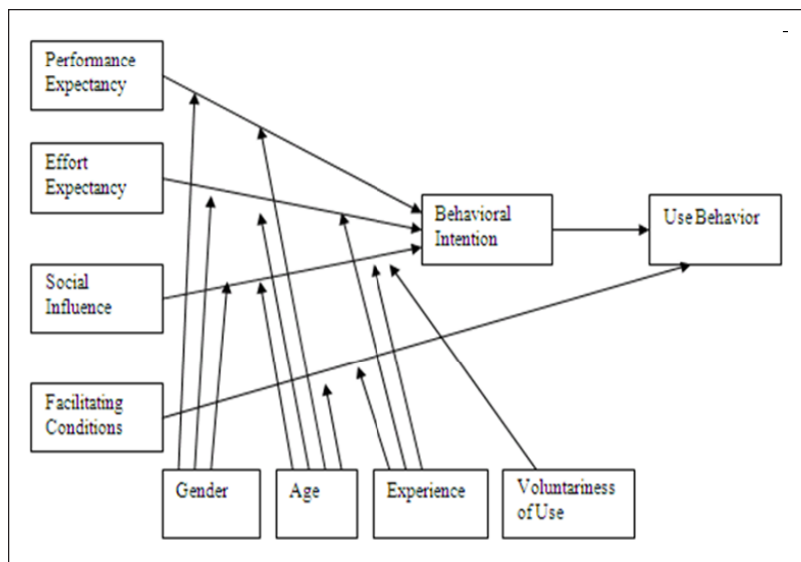

Figure 1. UTAUT Model of Venkatesh et al. (2003)

Empirical tests showed that the UTAUT model explains about 70% of the variance or adjusted R^2 in the *behavioural intention* of consumers to use IT. This model has highest explanatory power; the other eight models can only explain between 17–53% of the adjusted R^2 or variance in the *behavioural intention* of consumers to use IT (Al-Qeisi, 2009; Armida, 2008; Cameron, 2006; Indrawati et al., 2010a; Moran, 2006; Niehaves & Plattfaut, 2010; Venkatesh et al., 2003; Wu et al., 2008). Studies on the original UTAUT show that the R^2 for behavioural intention of consumers or prospective consumers to use technology is between 0.51 and 0.77 (Al-Qeisi, 2009; Armida, 2008; Cameron, 2006; Moran, 2006; Niehaves & Plattfaut, 2010; Venkatesh et al., 2003; Wu et al., 2008).

This model then developed by Venkatesh, Thong, and Xu. According to Venkatesh et al (2012:157), UTAUT has distilled the critical factors and contingencies related to the prediction of behavioral intention to use a technology in organizational context. Development of UTAUT model to UTAUT 2 was to study and understand acceptance and use of technology in consumer context. There are three types of UTAUT extensions/integrations. The first type of extension/integration examined UTAUT in new contexts, new user populations, and new cultural settings. The second type is the addition of new constructs in order to expand the scope of the endogenous theoretical mechanisms outlined in UTAUT, and the third type is the inclusion of exogeneous predictors of the UTAUT variables. Venkatesh et al add three new constructs to UTAUT model, such as Hedonic Motivation, Price Value, and Habit and also involve three moderating variable such as Age, Gender, and Experience.Study on the UTAUT2 show that UTAUT2produced a substantial improvement in the variance explained on behavioral intention of UTAUT from 56 percent to 74percentand technology use from 40 percent to 52 percent (Venkatesh et al, 2012). Thus, so far it can be concluded that UTAUT2 model is considered to be the best model in predicting behavioural intention and use behaviour in technology adoption research. Figure 1.2 indicates the relationship among constructs in the UTAUT2.
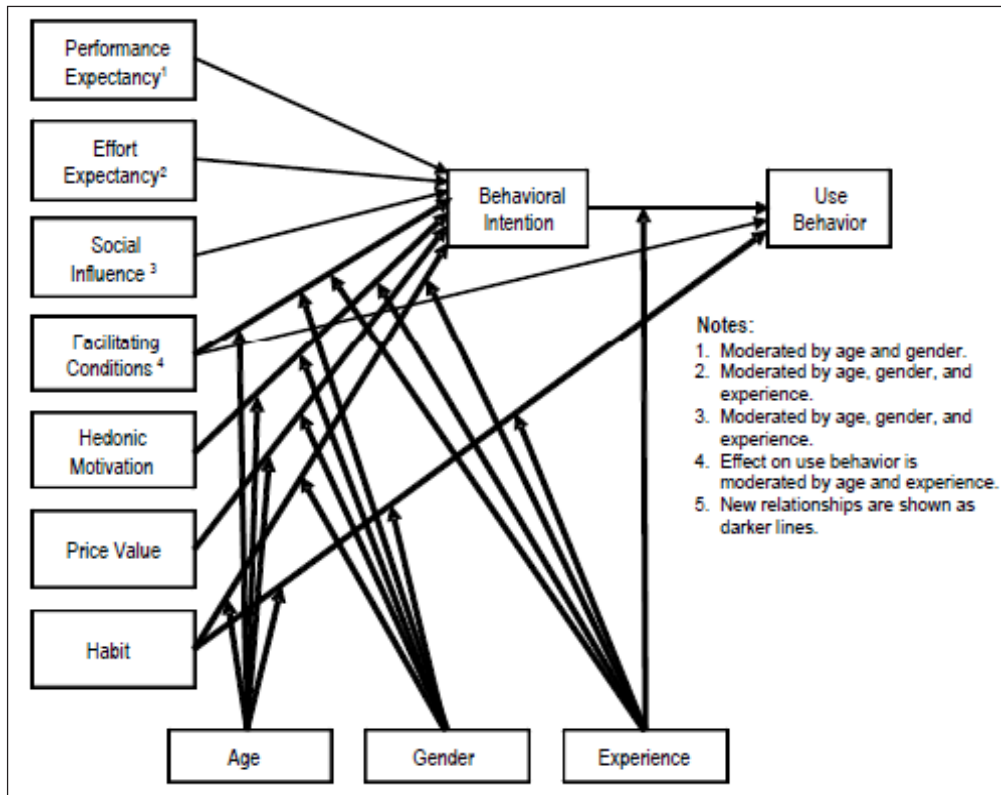
Figure 2. UTAUT 2 Model of Venkatesh (2012)

The following is the explanation of each variable in the UTAUT2 model:

a. Performance Expectancy

According to Venkatesh et al (2003:447), performance expectancy is defined as the degree to which a individual believes that using the system will help him or her to attain in job performance. Performance Expectancy is the strongest predictor of Behavioral Intention (Venkatesh et al, 2003:447). This result also found in research done by Pahnila, Siponen, and Zheng (2011:20), that Performance Expectancy, which combined Usefulness, Compatibility, and Relative Advantage from TAM and IDT, is the factor with most significant influence to Behavioral Intention. Venkatesh et al (2003:467) indicate that influence of Performance Expectancy to Behavioral Intention varied on Gender and Age, where the result showed more significant effect on younger men.

b. Effort Expectancy

According to Venkatesh et al (2003:450), effort expectancy is defined as the degree of ease associated with the use of the system. The research result from Venkatesh et al (2003:467) show that Effort Expectancy have positive effect to Behavioral Intention. The effect of Effort Expectancy to Behavioral Intention moderated by Gender and Age, which more significant on older women, and this effect decrease with increasing of Experience.

c. Social Influence

According to Venkatesh et al (2003:451), social influence is defined as the degree to which an individual perceives that important others believe he or she should use the new system. Social Influence is direct determinant of Behavioral Intention, with the most significant effect on older women and using technology as mandatory with a little experience.

d. Facilitating Conditions

According to Venkatesh et al (2003:454), facilitating conditions are defined as the degree to which an individual believes that an organizational and technical infrastructure exists to support use of system. In UTAUT 2 model, Venkatesh et al (2012:162) adds direct effect of Facilitating Conditions to Behavioral Intention. Based on Venkatesh et al research related to UTAUT 2 model, Facilitating Conditions have an effect to Behavioral Intention which moderated by Gender and Age.

e. Hedonic Motivation

According to Brown and Venkatesh (2005), hedonic motivation is defined as the fun or pleasure derived from using a technology, and it has been shown to play an important role in determining technology acceptance and use. Venkatesh et al (2012:171) stated that Hedonic Motivation is critical determinant factor of Behavioral Intention in non-organizational context.

f. Price Value

According to Venkatesh et al (2012:161), one of the important differences between use of technology in consumer and organizational context is consumer usually bear the monetary cost of such use whereas employees do not. Cost and price structure may have significant effect to use of technology by consumer. In consumer context, Price is an important factor because consumer must spent money to purchase of device and service. Price Value is positive when the benefits of using a technology are perceived to be greater than the monetary cost and such price value has a positive impact on intention.

g. Habit

According to Limayem, et al (cited from Venkatesh et al, 2012:161), habit has been defined as the extent to which people tend to perform behaviors automatically because of learning. Based on literature review related to Habit, there are three primary antecedents to habit development which seem to be valid across the board : frequent repetition of the behavior in question, the extent of satisfaction with the outcomes of the behavior, and relatively stable contexts (Limayem, Hirt, and Cheung, 2007:714).

h. Behavioral Intention

According to Ajzen (1991:181), intentions are assumed to capture the motivational factors that influence a behavior: they are indications of how hard people are willing to try, of how much of an effort they are planning to exert, in order to perform the behavior. Behavioral Intention in UTAUT model also playing role as predictor of Use Behavior.

i. Use Behavior

According to Wu, Yu, and Weng (2012:95), Use Behavior measure frequency of actual use of technology by user. Venkatesh et al (2012:166) stated that Use Behavior measured by frequency of using mobile Internet.

Interview Result

Tellefsen and Takada (1999), Takada and Jain (1991), Helsen et al. (1993), as well as Gatignon, Eliashberg, and Robertson (1989 cited in Im et al.,2007) reported that customers from different nations react differently to new, innovative technological products and services. As such, the present research focused on Indonesia and Malaysia, thus the UTAUT2 model should be adjusted to fit the local context (Indrawati et al., 2010).

To adjust UTAUT2 with the local contect, this study used interview and FGD to find the customers' perception on instant messenger application as one of application based on technology. FGD and interview are two of qualitative research techniques that are commonly used to find the answer of how and what people think about an object (s). The data gather are qualitative data which is more describing the customers interaction or behavior in using instant messenger application. The qualitative method is used to know the opinion of the respondents interviewed regarding the factors that may influence their decision in using instant messenger application.

The interview and FGD involved97 instant messenger application users in 11 cities in Indonesia and 36 instant messenger application users in 9 cities in Malaysia. Through this process, it was founded that both Indonesian and Malaysian users considered all the variables of UTAUT2 model and 2 new variables, namely interoperability and mobile friendlyness are important factors for their adoption.

The folowing are some statements from Indonesia customers regarding interoperability as an important factor influence behavior adoption of instant messenger application.

Ariwiati said that "Most of us still spend plenty of time at our computers, so being able to message across PC and mobile platforms is a feature that has been overlooked all too often by service providers".

Devy said that "sometimes, I have to make complicated report for my job , using PC more easier than mobile phone. Like WA,

now can be operated in PC too. This makes my work more faster and easier. That why I prefer if IMA can be used both in PC and mobile phone".

Melany said that "It would be easier for me to use IMA in any device according to the situation and working conditions".

Nadia said that "Because its offer us the flexibility; we can use it via mobile when we are in high mobility, also we can use it more comfortable via PC/laptop when we are at the office. To download some files sent to IMA, will also be easier using PC or laptop. In other hands, it will allow us to have backup data, just in case the problem occurs to the application on one of the mobile phone or PC/laptop".

Heidy said that "It would be easy to maintain or keep working when the mobile phone battery gets low, so just change to other devices and keep working".

Budhi said that "I prefer to use the application that can be used in mobile phone and PC because of the flexibility".

Ilya Nova said that "Because I am mobile person, I prefer to use application that can be used in both mpbile phone and laptop or PC devices. Such as Line, Telegram, and Hangout.

The folowing are some statements from Malaysia customers regarding interoperability as an important factor influence behavior adoption of instant messenger application.

Ridhuan said that "I like to use Facebook messenger because when I am doing my task on laptop and chatting at the same time, I do not need to open my laptop and mobile phone at the same time. I can online it on my laptop".

Inta said that "It is hard for me to use phone and laptop at the same time, so I prefer to use WhatsApp through laptop when I am using laptop".

Mahfud said that "If my mobile phone is not working, I can use that application on my laptop".

The folowing are some statements from Indonesia customers regarding mobile riendlyness as an important factor influence behavior adoption of instant messenger application.

Ariawati said that "Yes, I think it is important to have IMA which can deliver messages in any conditions of internet's bandwidth condition. Those application can compressed the traffic of data package especially when connection gets slow. Devy said that "yes I consider IMA which does not need large data storage, if IMA need large data storage, it will make the mobile phone slow to operate".

Rahma said that "I prefer the application that can send message in slow connection and need a bit of storage".

Lina Maulani said that "Sometime we are in the area that don't have fast connection of internet, but we still need to connect with other people easily. So, I think It will be great if the IMA application can still deliver message even though the internet connection is slow".

Ilya Nova said that "I prefer to use IMA which still can send message even the connection is slow and does not need large data storage".

The folowing are some statements from Malaysia customers regarding mobile riendlyness as an important factor influence behavior adoption of instant messenger application.

Hafiz said that "I prefer to use WhatsApp because when I receive some photo in group I can choose whether I want to save it later or now, meanwhile in Wechat if I open the photo it is automatically saved to my phone and it decrease my storage".

Inta said that "WhatsApp is still working eventhough the connection is slow. That is why I often use it in Malaysia".

Yang said that "I often use WhatsApp because eventhough the connection is slow, I still can receive or send a message.

Conclusion and Further Study

In light of the literatur review and interview as well as FGD result, the proposed conceptual model for predicting consumer behaviour toward instant messenger application adoption in Indonesia and Malaysia is as presented in Figure 3. The proposed model consists of nine core constructs and three moderators. The nine core constructs are performance expectancy, effort expectancy, social influence, facilitating conditions, price value, hedonic motivation, habit, mobile friendlyness and interoperability. The two moderators are age and gender.Mobile friendlyness is described as condition of the application that can be operated even the connection is slow and it only need little data storage.Interoperability is described as condition of the application that can be operated in mobile phone as well as PC or laptop.
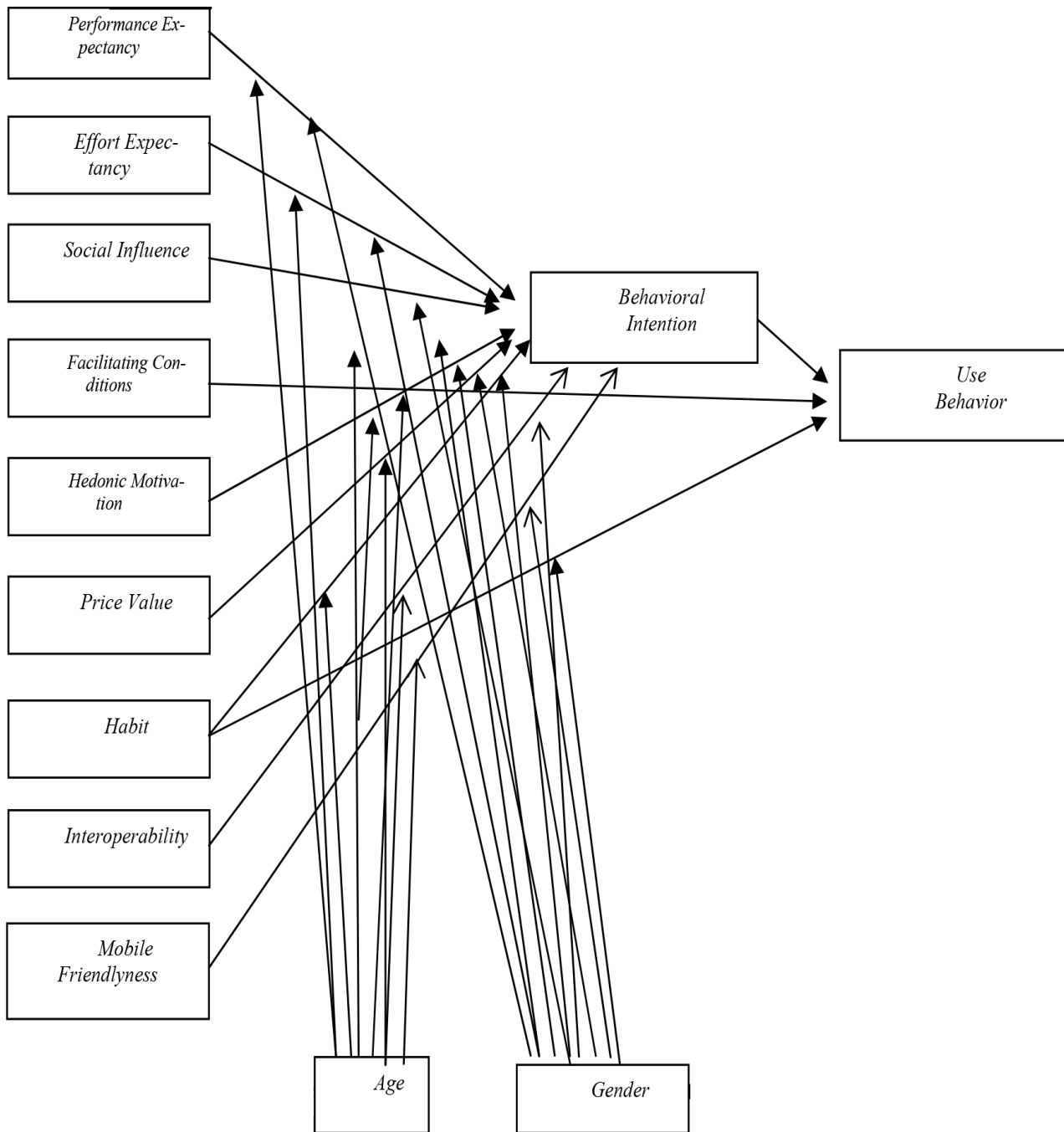

Figure 3. Proposed Model for Predicting Consumers Behaviour toward Instant Messenger Aplication Adoption

Further study that should be done are: a. composing measurement tool to test the proposed model based on the previous research and discussion with other researchers in technology adoption model. b. Testing the measurement to get the valid and reliable one.

References

[1] Admin (2014). *Tahun 2013, Aplikasi Instant Messaging Mobile JadiPrimadona*.Retrieved from http://www.jagatreview.com/2014/01/tahun-2013-aplikasi-instant-messaging

[2] Alkhunaizan, A., Love, S. (2012). What Drives Mobile Commerce? An Empirical Evaluation of the Revised UTAUT Model.*International Journal of Management and Marketing Management*, 2 (1), 82 – 99.

[3] Chin, W. W., Dibbern, J. (2010). An Introduction to a Permutation Based Procedure for Multi-Group PLS Analysis. In V. E. Vinzi, W. W. Chin, J. Henseler, H. Wang (Eds.), *Hanbook of Partial Least Squares Concepts, Methods, and Application*. (171 – 193). Berlin: Springer

[4] Compeau, D. R., Higgins, C. A. (1995b). Computer Self-Efficacy: Development of a Measure and Initial Test. *MIS Quarterly*. 19 (2), 189-211

[5] Compeau, D. R., Higgins, C. A., Huff, S. (1999). Social cognitive theory and individual reactions to computing technology: A longitudinal study. *MIS Quarterly*, 23 (2), 145-158.

[6] Davis, F.D. (1986). *A Technology Acceptance Model for Empirically Testing New End-User Information Systems : Theory and Results*. (Doctoral Dissertation, Massachusetts Institute of Technology, 1986)

[7] Davis, F.D. (1989).Perceived usefulness, perceived ease of use, and user acceptance of information technology.*MIS Quarterly*, 13 (3), 319-340.

[8] Davis, F. D., Bagozzi, R. P., Warshaw, P. R.(1992). Extrinsic and Intrinsic Motivation to Use Computers in the Workplace. *Journal of Applied Social Psychology*, 22 (14), 1111- 1132.

[9] Farabi, I. (2013). *JumlahPesanMelaluiAplikasi Instant Messenger KiniSudahLampaui SMS*.Retrieved fromhttp://www.trenologi.com/2013043014391/jumlah-pesan-melalui-aplikasi-instant-messenger-kini-sudah-lampaui-sms/

[10] Indrawati (2012) *Behavioral Intention to Use 3G Mobile Multimedia Services in Indonesia*, Doctoral Dissertation, Multimedia University Malaysia

[11] *Inilah 10 AktivitasPengguna Smartphone di Indonesia BerdasarHasil Survey Nielsen 2013*. (2013). Retrieved from http://harianti.com/inilah-10-kebiasan-pengguna-android-di-ind

[12] Lewis, C. C., Fretwell, C. E., Ryan, J., Parham, J. B. (2013). Faculty Use of Established and Emerging Technologies in Higher Education: A UTAUT Perspective. *International Journal of Higher Education*, 2 (2), 22 – 34.

[13] Ringle, C. M., Wende, S., Will, A. Will. (2005). SmartPLS 2.0 (beta) [Online]. Available: www.smartpls.de.[2009, March 13].

[14] Sinaga, R. (2014). *APJII: Penguna Internet di Indonesia TerusMeningkat*. [Online]. http://www.antaranews.com/berita/414167/apjii-penguna-internet-di-indonesia-terus-meningkat [25 Februari 2014]

[15] Urbach, U., Ahlemann, F. (2010) Structural Equation Modeling in Information Systems Research Using Partial Least Squares.*Journal of Information Technology Theory and Application*. 11 (2), p. 5-40 (2010).

[16] Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F.D. (2003). User Acceptance of Information Technology: Toward A Unified View. *MIS Quarterly*, 27 (3), 425 – 478.

[17] Venkatesh, V., Thong, J. Y. L., Xu, X. (2012). Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology. *MIS Quarterly*, 36 (1), 157 – 178.

[18] Wu, Y.L., Tao, Y., and Yang, P.C. (2008).The use of unified theory of acceptance and use of technology to confer the behavioral model of 3G mobile telecommunication users, *Journal of Statistics & Management Systems*, 11 (5), 919–949.