The Role of Privacy Concerns and Trust in User Acceptance of Instant Messaging Usage Intention

Ari Kusyanti and Misbahul Ma'ruf A.K.

***Abstract*— Telegram is a messaging application that is quite popular nowadays. However, at this time there is not yet known what factors can affect behavioral intention of Telegram. This research focuses on the factors that influence behavioral intention of Telegrams' users. This research proposes a model based on Unified Theory of Acceptance and Use of Technology (UTAUT) combined with a privacy concerns, trust and enjoyment based on previous studies. This research conducted a questionnaire survey with 300 respondents. Data collected is analyzed using Structural Equation Modelling (SEM). The result of this research shows that three of the six hypotheses influencing behavioral intention are acceptable, which are effort expectancy, performance expectancy, and trust.**

***Keywords*—Telegram, UTAUT, Trust, Privacy Concerns, Enjoyment, Structural Equation Modeling.**

I. Introduction

As social beings, communication is the basis for everyone to interact with other people and played an important role in everyday life. Communication is the interaction between human either individually or within groups [1]. There are some media that can be used to communicate by leveraging technologies including using the internet. One of them is the messaging application, such as WhatsApp, Line, and Telegram. With the messaging application communication becomes more rapid and practical. Telegram is one messaging application with a focus on speed and security. This application is extremely fast, simple and frees [2]. Telegram can be used on the computer, tablet or mobile phone. Users can send messages, photos, videos or files via Telegram. Telegram was developed by Pavel Durov and Nikolai Durov and first released on August 14, 2013 for the iOS-based devices. According to the Telegram, until February 2016 active users monthly Telegram reached more than 100 million users and new users register 350,000 per day. In addition, 15 billion messages sent via Telegram each day [3].

Telegram can help users to communicate with people in a fast and safe way. Telegram allows its users to communicate secretly by using secret chat. Secret chat is encrypted and only users who know the key. Additionally, the data of secret chat is not stored on the server and the message will be destroyed (self-destructing messages) after the user has read the message and countdown time has elapsed. With this new additional features of Telegram, invites its user to enjoy them and trust the application. Besides, it also attracts users who concern regarding their privacy about their personal data. These factors will be evaluated whether they influenced behavioral intention in using Telegram.

Behavioral intention certainly is influenced by several factors. Venkatesh et al mention in his research that acceptance of information technology is influenced by performance expectations, effort expectations, social influence, and the facilitating conditions [4]. However, the research had not yet considered abovementioned factors based on Telegram's new features. Therefore this research focuses on evaluating factors that influence behavioral intention of Telegram user based on UTAUT model, combined with enjoyment, trust and privacy concerns factors due to the new additional features of Telegram.

II. Previous Work

A. The Unified Theory of Acceptance and Use of Technology (UTAUT)

UTAUT is a model that describes the factors that affect the acceptability of the individual towards information technology developed by Venkatesh et al [4]. All four of these factors are:

1) Performance Expectancy
   Performance expectancy is defined as how high a person believes that using the system will help him to enhance performance in his job.
2) Effort Expectancy
   Effort expectancy is defined as level ease of use of the system or level of how an individual will be able to reduce the effort in doing his job.
3) Social Influence
   Social influence is defined as an individual's level of confidence that other people convince him to use the new system.
4) Facilitating Conditions
   Facilitating conditions is defined as an individual's level

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of confidence that organizational and technical infrastructure available to support the use of the system.

In addition to these four variables, the UTAUT also has variables that serve as the mediator who strengthened the influence of the four main variables behavior. These variables are gender, age, experience and voluntariness of use. UTAUT model can be seen in Figure 1.

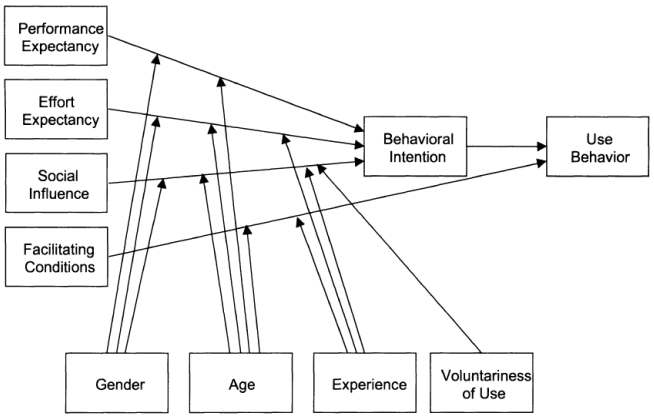

Fig. 1. Unified Theory of Acceptance and Use of Technology

B. Trust

Trust can be described as a belief that the other party will behave socially responsible, and will thus meet the expectations of individual without taking advantage of existing vulnerabilities [5]. In research conducted by Alharbi presents a revised UTAUT model by adding a variable trust on acceptance of cloud computing [6].

C. Enjoyment

According to Davis, et al enjoyment is defined as the extent to which the activity is considered fun. Enjoyment has positive influence toward the behavior to use technology and is classified as a type of motivation [7]. Research conducted by Ibrahim and Jaafar aims to predict the factors that influenced the acceptance of students toward educational games [8]. This research uses UTAUT which adds two new variables i.e. learning opportunities and enjoyment. All these variables have an impact on behavioral intention.

D. Privacy Concerns

Privacy concerns is defined as the level of individual believes that organizational and technical infrastructure is available to prevent the violation of privacy [9]. According to Smith, et al privacy constructs consist of four components, namely [10]:

1) Collection
   Collection reflects the concerns of a number of personal data collected and stored in the database.
2) Unauthorized Secondary Use
   Unauthorized secondary use reflect the concerns of the information that is collected from a person for a specific purpose is used for another purpose without the consent of the owner of such information.
3) Errors
   Errors reflect concerns protection against errors.
4) Improper Access
   Improper access reflects the concern that one's data can be viewed and processed by another people.

Research conducted by Xu and Gupta aims to integrate the theory and research of information privacy and acceptance of technologies to build a conceptual model of the reception Location-Based Services (LBS). Xu and Gupta hypothesized privacy concerns has an impact on performance expectancy, effort expectancy, and intention to use (behavioral intention) [9].

III. Research Model and Hypotheses

The model in this study is a modification of the model of UTAUT combined with variables adapted from the study of Xu and Gupta, Ibrahim and Jaafar, and Alharbi. The models used in this research can be seen in Figure 2.

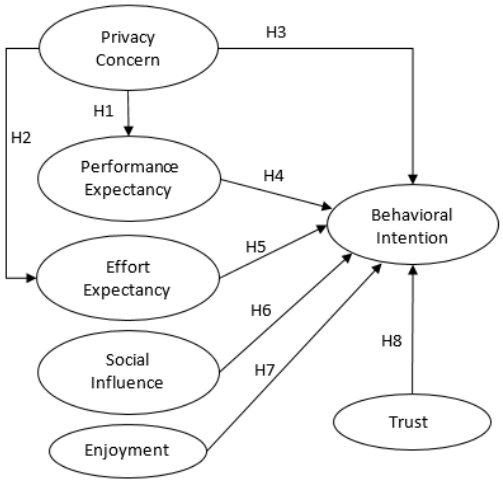

Fig. 2. Research Model

There are eight hypotheses that have been formulated and will be tested whether the hypothesis is accepted or rejected. The eighth hypothesis are:

H1: Privacy concerns has significant negative influence towards performance expectancy.
H2: Privacy concerns has significant negative influence towards effort expectancy.
H3: Privacy concerns has significant positive influence towards behavioral intention.
H4: Performance expectancy has significant positive effects against behavioral intention.
H5: Effort expectancy has significant positive effects against Behavioral Intention.
H6: Social influence has significant positive influence towards behavioral intention.
H7: Enjoyment has significant positive influence towards behavioral intention.
H8: Trust has significant positive influence towards behavioral intention.

This research uses the analysis of Structural Equation

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Modeling (SEM) to test the suitability of the hypothesis or the relationship in the research model.

IV. Data analysis

A. Pilot study

A pilot study was conducted to identify and detect errors and ambiguities of the questionnaire before doing the final survey [11]. Firstly, the questionnaire is evaluated by two pilot questionnaire respondents [12]. Respondents were chosen by the researchers, and they are asked to evaluate 33 statements contained in the questionnaire. The response from the pilot respondents stated that almost entire statement can be understood.

Afterwards, the reliability testing is performed to measure the level of consistency of respondent's answers for all of these questionnaires using Cronbach's Alpha. The number of samples for a pilot study of 10% of the amount of the final sample [13]. The Cronbach's Alpha criteria is: Excellent ($\alpha > 0.9$), Good ($0.7<\alpha<0.9$), Acceptable ($0.6<\alpha<0.7$), Poor ($0.5<\alpha<0.6$), Unacceptable ($\alpha<0.5$) [14]. Table 1 presents the Cronbach's Alpha coefficients for all latent variables obtained from the pilot study.

TABLE 1
Cronbach's Alpha coefficients

Construct	Cronbach's Alpha
Performance Expectancy	0.889
Effort Expectancy	0.885
Social Influence	0.703
Behavioral Intention	0.922
Trust	0.924
Enjoyment	0.844
Privacy Concern	0.858

B. Data collection

In this study, 305 questionnaires are collected. However, there was 1 respondents who entered invalid data and there are 4 duplicates questionnaire data. Therefore, the remaining 300 questionnaires will be used for further analysis.

C. Missing data

Missing data testing is conducted to locate empty data. There are 4 questionnaires that are not filled completely and therefore they are deleted.

D. Outliers

To observed outliers, Mahalanobis Distance is determined. Outlier data is data that is different from the average of the existing data. The critical value of the Mahalanobis is 63.8701. There are 17 data that is not met the criteria of Mahalanobis Distance, therefore these 17 data are discarded from the analysis.

E. Normality

In this study, to find out data normality we are used the skewness and kurtosis. The maximum acceptable limits of observation values up to ±1 for skewness and up to ±3 for kurtosis [11]. The result of the skewness and kurtosis test are no deviation from data normality.

F. KMO and Bartlett's Test

KMO and Bartlett's Test Sphericity indicates the value of Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy [11]. The results of KMO and Bartlett's Test is 0.873 which shows the sampling is adequate.

G. Model fit

After observing missing data, data outliers, normality and KMO and Bartlett's, then the next test will be the model fit testing. At this stage all the latent variables in the model are connected by using a two-way arrow (covariances). Table 2 show goodness of fit indices which is already meets the criteria.

TABLE 2
Goodness of Fit Indices of Research Model

Index	Criteria	Value	References
Chi-Square	X^2, df, $p > 0.05$	603.378	[15-19]
Normed Chi-Square	$1.0 < X^2/df < 3.0$	1.600	
GFI	> 0.80	0.876	
RMSEA	< 0.05 *good fit* < 0.08 *acceptable fit*	0.046	
CFI	> 0.90	0.962	
NFI	> 0.90	0.906	
AGFI	> 0.80	0.848	

H. Measurement Model

Measurement model is performed to find out whether the manifest variables have significant effects towards its latent variables. Measurement model is done by using Confirmatory Factor Analysis (CFA). The relationship of the manifest variables and its latent variables is based on the p-value <0.05, critical ratio >1.96, and estimate or loading factor >0.5 [17-21].

The result of the model shows that all relations between latent variables and the manifest variables have a significant relationship. Afterwards, construct reliability and convergent validity are performed. Test result of construct reliability and convergent validity is acceptable since the minimum cut-off criteria of construct reliability is >0.7 and AVE >0.5 for convergent validity [11]. Construct reliability and convergent validity of the model can be seen in Table 3.

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TABLE 3
CONSTRUCT RELIABILITY AND CONVERGENT VALIDITY OF THE MODEL

Construct	Construct Reliability	AVE
PE	0.916	0.731
EE	0.888	0.667
SI	0.799	0.667
TR	0.919	0.791
BI	0.980	0.943
EN	0.887	0.723
PC	0.918	0.514

I. Structural Model

After the model fit and measurement model is good, next stage is conducting structural model using path analysis. Structural models test is used to determine whether the research hypothesis is accepted or rejected. The result of the Structural Model can be seen in Figure 3.

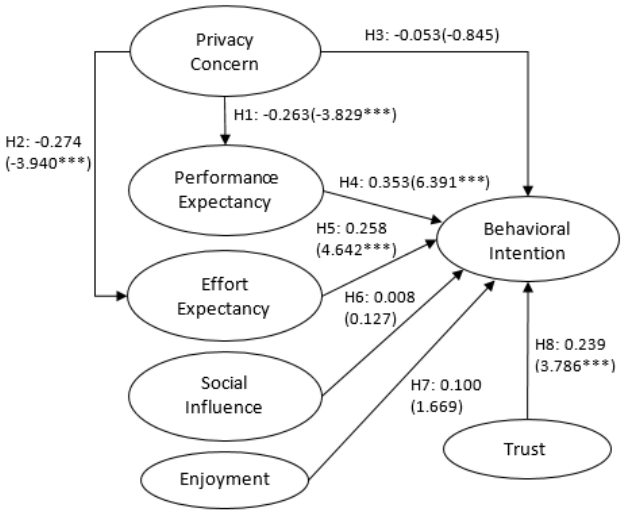

Fig. 3. The Result of Structural Model

Table 4 shows the estimation value of the formulated hypotheses. Based on the cut-off criteria, there are 5 hypotheses that are accepted and 3 hypotheses are rejected.

TABLE 4
ESTIMATION VALUE OF FORMULATED HYPOTHESES

Hypotheses	Critical ratio	P	Result
PC ---> PE	-3.829	***	Significant
PC ---> EE	-3.940	***	Significant
PC ---> BI	-0.845	0.398	Not Significant
PE ---> BI	6.391	***	Significant
EE ---> BI	4.642	***	Significant
SI ---> BI	0.127	0.899	Not Significant
EN ---> BI	1.669	0.095	Not Significant
TR ---> BI	3.786	***	Significant

V. DISCUSSION

Based on the results of processing and data, the results obtained from the formulated hypothesis are discussed below:

1) H1: Privacy Concerns has significant negative influence towards Performance Expectancy
   The results showed that privacy concerns negatively influence performance expectancy. The results are consistent with previous research conducted by Xu and Gupta [9]. Therefore hypothesis H3 is accepted, which means that respondents believe that privacy concerns negatively influence performance expectancy.
2) H2: Privacy Concerns has significant negative influence towards Effort Expectancy
   The results showed that privacy concerns negatively influence effort expectancy. The results are consistent with previous research conducted by Xu and Gupta [9]. When respondents are aware of privacy risks, there are not to use Telegram, thus, increasing the effort required to communicate. Therefore hypothesis H2 is accepted, which means that respondents believe that privacy concerns negatively influence effort expectancy.
3) H3: Privacy Concerns has significant positive influence towards Behavioral Intention
   The results showed that privacy concerns not influence users' intentions to use Telegram. The results are consistent with previous research conducted by Xu and Gupta [9]. In their study, users' decision to adopt location-based services is not influenced by privacy concerns. Therefore hypothesis H3 is rejected, which shows that privacy concerns is not considered by the Telegram user. They do not care with the additional features of Telegram will prevent their privacy or not.
4) H4: Performance Expectancy has significant positive effects against Behavioral Intention
   The results showed that performance expectancy positively influence users' intentions to use Telegram. The results are consistent with previous research conducted by Phichitchaisopa and Naenna, Chauhan and Jaiswal, and Tan [22-24]. Therefore hypothesis H4 is accepted, which means that by using Telegram, its users believe that they can enhance their performance.
5) H5: Effort Expectancy has significant positive effects against Behavioral Intention
   The results showed that effort expectancy positively influence users' intentions to use Telegram. The results are consistent with previous research conducted by Phichitchaisopa and Naenna, Chauhan and Jaiswal, and Tan [22-24]. Therefore hypothesis H5 is accepted, which means that by using Telegram, its users believe that Telegram is easy to use or in other word, it needs less effort to communicate with Telegram.
6) H6: Social Influence has significant positive influence towards Behavioral Intention
   The results showed that social influence not influence users' intentions to use Telegram. The results are consistent with previous research conducted by Phichitchaisopa and Naenna, and Chauhan and Jaiswal

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[22-23]. In their study, users' decision to adopt technology is not influenced by pressure from the other. Therefore hypothesis H6 is rejected, which concludes that social influences does not influence users to use Telegram. They do not care the opinions from others regarding the use of Telegram.

7) H7: Enjoyment has significant positive influence towards Behavioral Intention
   The results showed that enjoyment is not influence users' intentions to use Telegram. The results are consistent with previous research conducted by Yang et al. [26]. In their study, users' decision to adopt mobile travel booking is not influenced by enjoyment. Therefore hypothesis H7 is rejected, which means that by using Telegram, is not considered as fun activities.
8) H8: Trust has significant positive influence towards Behavioral Intention
   The results showed that trust positively influence users' intentions to use Telegram. The results are consistent with previous research conducted by Alshehri [25]. Therefore hypothesis H8 is accepted, which shows the respondent's level of confidence at Telegram affects the intention to use Telegram with its new additional features.

VI. Conclusion

Based on the results of the analysis can be conclude that the factors which affect behavioral intention of Telegram are performance expectations, effort expectations and level of trust. In addition privacy concerns will cause Telegram users reduces opportunities to improve their performance and their will expend more efforts to communicating with others.

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