Measurement of Information Security Awareness Among Social Media Twitter Users in Indonesia

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Abstract

Twitter with 320 million active users worldwide, seen as an opportunity for criminals with intent to harm, due to the lack of users' information security awareness. In Indonesia there was a fraud case committed by a college student using a fake Twitter account. The aim of this research is to gain a deeper insight into the level of security awareness among Twitter users in Indonesia based on their group of demographics and knows the relationship between them. The respondent of this research belonged to different gender, age, educational backgrounds, employment, income and hours spent on smartphone and PC. Data was collected and then analysed based on the category of the questions related to basic awareness, technical awareness, advocacy and responsiveness towards the usage of Twitter. It can be concluded that male Twitter users, aged between 29-39 years old, worked as civil servant/private employee, completed postgraduate courses, generated monthly income of above 8 million rupiah and spent time on smartphone and PC for 11-20 hours has the highest level of security awareness. However, Twitter users have to pays more attention in technical setting used in managing their account.

Keyword: *Security Awareness, Media Social, Twitter, Demographics*.

1. Introduction

Social media has become a need among society to interact, share information and communicate with each other ubiquitously. As of 2015, Indonesia is a second country with the most active social media users in the world (Global Web Index, 2015). The number of Twitter users in Indonesia is approximately 50 million users. Thus, the big number of Twitter users is seen as an opportunity for criminals with intent to harm, due to the lack of users' information security awareness. It was revealed that there are 5 common Twitter scams, such as money-based scheme, bot spam, pay-for-follower ploys, false DMs and worms (Tripwire, 2016). Below are some of the cases of misuse on Twitter:

Table 1: Table of Cases Involves Twitter

No.	Time	Event	Source
1.	2009/2/12	US congressman in row over use of Twitter during Baghdad trip	Johnson (2009)
2.	2013/4/23	AP hack proves Twitter has a serious cybersecurity problem	Pepitone (2013)
3.	2013/10/16	Charity scam via Twitter	Amrullah (2013)

4.	2015/10/07	British man accused of sending stock prices tumbling in £1million fraud using fake Twitter accounts set up at his home in a tiny Scottish village.	Spillett (2015)

One factor that is assumed to be the cause of the low level of awareness among social media users is their negligence in adhering to policy and rules in using social media. Most of social media users does not read the privacy policy and believed that the benefit they gained outdo risks they exposed to (Al-Daraiseh, et.al 2014:130). The aim of this research is to gain a deeper insight into the level of security awareness among Twitter users in Indonesia based on their group of demographics and knows the relationship between them.

2. Literature Review

A. Information Security
Information security is how to prevent fraud (cheating) or, at least, detecting fraud in an information-based system, where information itself has no physical meaning (Simons in Rahardjo, 2005).

B. Security Awareness
Security Awareness (SA) is the control designed to minimize the breach of information security, whether from negligence or actions that have been planned (Whitman & Mattord, 2011:595). It is consisted of four categories, which are basic awareness (basic knowledge about user activity on the site), technical awareness (user's setting to manage his personal account), advocacy (the effort to educate people), and responsiveness (respond to incident) (Dhull, et.al, 2014:30).

C. Demographic Segmentation
Segmentation is one of the process in planning marketing strategy. Demographic segmentation is categorizing the market into groups based on variables such as age, gender, family size, family life cycle, income, occupation, education, religion, race (Kotler and Armstrong, 2008:46).

3. Methodology

This research uses quantitative descriptive method of collecting data through online questionnaires with 400 respondents who have Twitter accounts. The data were collected and processed using statistical analysis. Descriptive cross tabulation method was used for data analysis and SPSS v20.0. These questions were taken from the Journal of Dhull et al. (2014). Respondents came from various genders, age, educational background, employment, income and hours spent on smartphone and PC. The researchers analyzed security awareness with the following questions:

Table 2: Survey Questions for Security Awareness

Variables	Question
Basic_1	Aware of pretenders and are very vigilant (in adding them as your friend).
Basic_3	Share or post your personal information such as your phone numbers, home/work address in your profile.
Basic_4	Do you think before posting your photos (to avoid it from being exploited).
Technical_1	Use privacy setting of the social media site.
Technical_2	Know what to do when your social media account attacked.
Technical_3	Install monitoring software to monitor online activities.
Technical_4	Enable privacy setting to restrict who can post and access information on your children websites
Advocacy_1	Educate them on what information should be kept private and not shared.
Advocacy_2	Tell them to inform you if someone asks or talks about sensitive issues that makes them uncomfortable.
Advocacy_3	Tell them that information posted online cannot be taken back.
Responsiveness_1	Respond to harassing or threatening comments posted on your profile
Responsiveness_3	Report to Twitter when your account is being misused by unauthorized party.

Source: Dhull, et.al (2014)

The same research was also conducted by Sari, et.al. (2016) about the awareness of Facebook users which also focused on the awareness of demographic groups of age, gender, educational background and income. Thus, the researchers would like to use the same question and add several questions that are suitable in Twitter application features, such as connect with other social network, enable geotagging and use hashtage in tweet, in the current research. But after undergoing validation test, there were 7 invalid items, which were Basic_2, basic_5, basic_6 and Responsiveness_2, Fitur_1, fitur_2 and Fitur_3. So in this research, the researcher just used 12 questions.

4. Data Processing and Discussion

4.1 Users'Awareness Based on Gender

From table 3, it is shown that the average men (68,77%) has a higher level of security awareness than women (64,72%), because men have a behavior that is more analytical and logical in making decision to purchase or consume the product (in this case Twitter) in order to reduce the risks that occur due to lack of information security awareness (Mitchell et.al, 2004:331).

Table 3: Result of Crosstab Based on Gender

	Men (%)		**Women (%)**	
	Yes	**No**	**Yes**	**No**
Average of Basic	76,6	23,4	79,8	20,1
Average of Technical	58,55	41,45	52,8	47,2
Average of Advocacy	69,13	30,86	61,1	29,15
Average of Responsiveness	70,8	29,2	65,2	34,8
Total Average	68,77	31,22	64,72	32,81

Source: Processed Data of SPSS v20.0

4.2 Users' Awareness Based on Age

The table 4 below illustrates that the average of users aged from 29-39 years old have a high level of security awareness which is 84.9%. While indicator with the highest average score is responsiveness in users who aged above 39 years old, 100%.

Tabel 4: Result of Crosstab Based on Age

	< 18 y.o (%)		**18-28 y.o (%)**		**29-39 y.o (%)**		**> 39 y.o (%)**	
	Yes	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**
Average of Basic	53	47	82,9	17,1	88,3	12	50	50
Average of Technical	29,5	70,5	54,17	45,82	76,65	23,35	50	50
Average of Advocacy	39,3	60,66	62,9	37,1	88,3	11,6	50	50
Average of	52,55	47,45	43,5	34,7	86,7	13,3	100	0

Responsiveness								
Total Average	43,5	56,4	60,8	33,68	84,9	15,06	62,5	37.5

Source: Processed data of SPSS v20.0

According to the result obtained, it appears that users whom have the highest level of securiy awareness are those who aged 29-29 years old. And users in this age category are belong to the Generation X, which is a generation that believe that information and technology are the essential part of a goods or service, and in their opinion, technology can change the world and the ability to operate technology is very much appreciated (Williams et.al, 2011:24).

4.3 Users' Awareness Based on Educational Background

Table 5 below displays that Twitter users with postgraduate degree has a higher level of awareness than the others because it has a total score of 91.71%, and indicator with the highest number is in advocacy, 97.4%.

Table 5: Result of Crosstab Based on Educational Background

	Middle/Senior High School (%)		**Associate (%)**		**Bachelor (%)**		**Postgraduate (%)**		**Doctorate (%)**	
	Yes	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**
Average of Basic	57,7	42,2	71,7	28,2	90,6	9,3	91,2	8,8	75	25
Average of Technical	36,05	63,95	52,7	47,3	61,9	38,1	83,5	16,4	56,25	43,75
Average of Advocacy	41,7	58,3	57,9	42	73,5	26,4	97,4	2,6	58,3	41,6
Average of Responsiveness	50,4	49,6	70,65	29,35	71,5	28,5	94,75	5,25	87,5	12,5
Total Average	46,46	53,51	63,23	36,71	74,3	25,5	91,71	8,26	69,26	30,71

Source: Processed Data of SPSS v20.0

Based on acquired result, users with postgraduate degree have a higher level of information security awareness, because users who have a higher education are more aware of the information security in carefully adding friends and educate people regarding information security (Dhull, et.al, 2014:30).

4.4 Users' Awareness Based on Employment

Table 6 illustrates that the Twitter users who work as civil servants/private employee has the highest awareness level of 81.6%, with basic as an indicator with the highest number, that is 89.1%.

Table 6: Result of Crosstab based on Employment

	Entrepreneur (%)	**Student (%)**	**University Student (%)**	**Housewive (%)**	**Civil Servant/Private Employee (%)**

	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Average of Basic	67,8	32,1	32,5	67,4	90,4	9,6	65,8	34,2	89,1	10,8
Average of Technical	56,3	43,6	31,55	68,45	46,4	53,6	47,2	52,7	72,6	27,4
Average of Advocacy	71,5	28,5	42,8	57,1	51,7	46,2	57,7	42,3	82,2	17,7
Average of Responsiveness	69,1	30,9	54,75	45,25	58,7	41,3	55,45	44,55	82,6	17,6
Total Average	66,17	33,75	40,4	59,55	61,8	37,6	56,5	43,43	81,6	18,3

Source: Processed Data of SPSS v20.0

Based on attained result, Twitter users who employed as civic servant / private employee has the highest level of awareness, than other employment categories because those who worked have a deep knowledge of the practice and awareness of information security, because they had undergo training in information security issues and threats, so they are cautious in using social media, especially in sharing information (Talib et.al, 2010:1).

4.5 Users' Awareness Based on Income

The table 7 below shows that the Twitter users who have a monthly income of more than 8 million rupiah, has the highest awareness level of 89.4%, with responsiveness as the indicator with the highest number, which is 94.65%.

Table 7: Result of Crosstab based on Income

	< Rp.3.000.000 (%)		**Rp.3.000.000 – Rp.8.000.000 (%)**		**> Rp.8.000.000 (%)**	
	Yes	**No**	**Yes**	**No**	**Yes**	**No**
Average of Basic	72,8	27,2	84,2	15,8	91,6	8,3
Average of Technical	41,37	58,6	70,02	29,9	78,6	21,4
Average of Advocacy	47,3	52,6	82,9	17,1	92,8	7,1
Average of Responsiveness	53,9	46,1	81,4	18,6	94,65	5,55
Total Average	53,8	46,1	79,63	20,35	89,4	10,5

Source: Processed Data of SPSS v20.0

According to the obtained result, Twitter users with the monthly income of above 8 million rupiah has the highest level of awareness, because people with higher incomes have an abudance resource that can be involved for their self-orientation (Setiadi, 2003: 44). The self-image is something that is important to them, not because

of status but as an extension of tastes, freedom and their characters. Therefore, users with higher incomes have a higher security awareness, because their image would be affected if they are less aware of the information security.

4.6 Users' Awareness Based on Hours Spent Accessing Twitter on Smartphone or Tab

The table 8 below illustrates that users who spend time accessed Twitter on a smartphone for 11-20 hours have a higher awareness level of 68.1% although for basic indicators, users with access time of 21-30 hours has the highest number, that is 86.6%.

Table 8: Result of Crosstab based on Hours Spent Accessing Twitter on Smartphone or Tab

	1-10 Hours (%)		11-20 Hours (%)		21-30 Hours (%)		> 30 Hours (%)	
	Yes	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**
Average of Basic	76,4	23,5	86,4	13,6	86,6	13,3	82,4	17,5
Average of Technical	59,2	41,9	48,15	51,85	48,75	51,25	38,15	61,85
Average of Advocacy	65,6	34,4	70,4	29,6	46,6	53,3	45,6	54,4
Average of Responsiveness	68,85	31,15	67,6	64,8	60	40	52,65	47,35
Total Average	64,5	32,7	68,1	39,9	60,4	39,4	54,7	45,2

Source: Processed Data of SPSS v20.0

Based on the acquired result, Twitter users with access time for 11-20 hours per week have a level of security awareness that is higher than the others,because smartphone users in Indonesia has a high level of security awareness (Sari, et.al, 2014:493).

4.7 Users'Awareness Based on Hours Spent Accessing Twitter on Laptop or PC

The table 9 below display that Twitter users with the access time of 11-20 hours have a higher awareness level of 73.6% compared to the others. Although for responsiveness indicator, Twitter users with access time more than 30 hours have a higher level of awareness than the others, with average value of its indicator 75%.

Table 9: Result of Crosstab based on Hours Spent Accessing Twitter on Laptop or PC

	1-10 Hours (%)		11-20 Hours (%)		21-30 Hours (%)		> 30 Hours (%)	
	Yes	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**
Average of Basic	78,4	21,6	83,3	16,6	72,2	27,7	58,3	41,6
Average of Technical	54,9	45,02	61,2	38,7	45,85	55,4	25	75
Average of	63,4	36,5	78,9	21,03	55,5	44,4	16,6	83,3

Advocacy								
Average of Responsiveness	67	33	71,05	28,95	66,65	33,35	75	25
Total Average	65,9	34,03	73,6	26,32	60,02	40,21	43,72	56,22

Source: Processed Data of SPSS v20.0

Based on the obtained results, Twitter users with access time for 11-20 hours per week have a higher level of security awareness than the other. While users with access time more than 30 hours had the lowest level of security awareness.

4.8 Relationships Between Awareness and Demography

Table 10: Result of Chi-square Test between Awareness and Demography

Item	Gender	Age	Educational Background	Employment	Income	Hours Spent on Smartphone or Tab	Hours Spent on Laptop or PC
Basic_1	×	√	√	√	√	×	×
Basic_3	×	√	√	√	√	×	×
Basic_4	×	√	√	√	√	√	×
Technical_1	×	√	√	√	√	√	×
Technical_2	√	√	√	√	√	×	×
Technical_3	×	√	√	√	√	×	×
Technical_4	×	√	√	√	√	√	×
Advocacy_1	×	√	√	√	√	√	√
Advocacy_2	×	√	√	√	√	×	√
Advocacy_3	√	√	√	√	√	√	√
Responsiveness_1	√	√	√	√	√	√	×
Responsiveness_3	×	√	√	√	√	×	×

Source: Processed Data of SPSS v20.0

Based on table 10, there are relationship between security awareness and gender, thus security awareness related with men and women in terms of account attacked, reminding people and responding to threats. It happens because men and women have a different set of behavior and attitude (Kotler & Keller, 2012). And for age category, all of item in security awareness are related with age because people of all ages have needs in their life to be fulfilled. Therefore, their taste in consuming things associated with age (Kotler & Keller, 2012).

Based on educational background, all of item in security awareness have a relationship with educational background, because education is not only can increase income, but also affecting attitude and behavior in daily activities (Tarigan, 2006). And as for employment category, all of item in security awareness is related with employment, because employment can affect consumer's pattern of consumption (Kotler & Keller, 2012).

Based on income, all of item in security awareness have a relationship with income, because people with higher incomes have an abundance of resource that can be involved in their self-orientation (Setiadi, 2003:44).

While for hours spent on smartphone or tab category, there are relationship between security awareness and hours spent on smartphone or tab, which is in terms of status posting, privacy setting, restrict information access, reminding people and respond to threat, because smartphone users in Indonesia has a high level of security awareness (Sari, et.al, 2014:493). And as for hours spent on laptop or PC category, there are relationships between security awareness and hours spent on laptop or PC, in advocacy such as educate people, report of misuse from people and remind people because people who spent more time on computer has a higher level of security awareness than those who do not (Abolarinwa, et.al, 2015:260).

5. Conclusion

Based on our research, security awareness' indicators overall score ranked from the highest to the lowest are advocacy, basic awareness, responsiveness and technical awareness. In terms of gender-based category, men respondent are more aware of information security awareness than women users. And regarding educational background category, respondents with postgraduate degree have a higher level of information security awareness than other educational background categories. Meanwhile, for employment category, respondent who worked as civil servant/private employee has a high level of security awareness. And as to income category, respondent with a monthly income of above 8 milion rupiah has a high level of security awareness.

With regard to hours spent on smartphone or tab category, respondent who spent 11-20 hours on smartphone or tab has a high level of security awareness. As for hours spent on laptop or PC category, respondent who spent 11-20 hours on laptop or PC has a high level of security awareness. Whereas both categories has the same result in users' level of security awareness, they differ in terms of relationships with security awareness, because hours spent on laptop or PC category only have relationship with advocacy, while hours spent on smartphone or tab category have relationship with more than one variable of security awareness.

6. Suggestion

The conclusion of this paper is expected to provide some suggestions, which are:

A. Twitter users pays more attention to technical setting used in managing their account.
B. Twitter alter the login process by obliges its user to enter email address and phone number for security reasons.
C. For further research, to focus on e-commerce sites, because of its rapid growth these past years.

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