

The Use Behavior of Tracking and Tracing Services in E-Commerce Logistics

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ABSTRACT

An increasing business transaction can cause rapid growth in online shops and marketplace. One of the affected is an online shop. From several logistic services, tracking and tracing information services are the main focus in this study because online shops as the business partner have a lack of attention in these services. The objective of this study is to investigate the factors of online shop behavior in using tracking and tracing information services. This study used a unified theory of acceptance and use of technology (UTAUT) as the framework. The quantitative data were collected through questionnaires from 207 samples of online shops selling women's fashion and listed in the marketplace. Data were analyzed using structural equation modeling (SEM) with LISREL 8.70. The result of this study found that "the intention to use" the tracking and tracing information services depend on the effort expectancy (EE) dan social influence (SI), while "user behavior" depends on facilitating condition (FC) and the intention to use. The ease of access factor and learning the tracking and tracing information services are the important factors for the intention to use, whereas electronic devices and internet network factors used by the online shops are the main factors for the user behavior. Logistics companies need to provide information services that can help the online shops in controlling their goods in a good way where the ease of access and learning become the main focus that needs attention. Furthermore, online shops need to facilitate their admins with technological devices and a good internet network to make the admins easy to access information services.

Keywords: Logistic services, online shop, tracking and tracing services, UTAUT.

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INTRODUCTION

The growth of online shop and marketplace begins with the ease of consumers buying goods they need and the transaction process between sellers and buyers becomes more effective and efficient. The impact makes logistics companies in Indonesia competing to improve their services because the relationship between logistics companies and online shops is now a cooperative relationship that benefits both parties. According to Bienstock *et al.* (2008), service quality was introduced to evaluate logistics capabilities in companies by increasing the value of products or services such as tracking and tracing information, the accuracy of the product received, the accuracy of the location of the recipient, the speed of arrival, the condition of the product, and the right price. From the several logistic services that are currently become the main focus of this research is how logistics companies adapt their tracking and tracing information services.

Tracking and tracing systems are the industry norm for providing services to customers which triggers a competitive advantage for Logistics Service Providers (LSP) (Shamsuzzoha *et al.*, 2013). The need for logistic tracking and tracing has been known for a long time, and thus Logistics Service Providers offer to track and collect data services to help problems consumers face in tracking their goods (Huvio *et al.*, 2002). Tracking is a system of collecting and managing information on a product to make it easier for consumers to find their goods while tracing is a system that stores the history of the product distribution cycle and component (Shamsuzzoha *et al.*, 2013). However, the fact is the condition of tracking and tracing information services in Indonesia according to the online shops, has a low level of importance compared to other logistics services (Widianti *et al.*, 2020).

This is certainly different in some countries that consider this service as an important service to advance a business. According to Mirzabeiki *et al.* (2013) tracking and tracing services are crucial services in supply chain activities in automotive companies in Sweden. This service is significant to reduce losses in a process. Meanwhile, tracking and tracing services are very important to manufacturing companies in managing logistics networks in Finland because tracking and tracing help to identify the delivery position and provide advance notice to its customers (Shamsuzzoha & Helo, 2011). Functionally, the tracking and tracing information services available in Indonesia have the same functions as those countries, but one factor that makes this service has a low level of importance is the adaptation of technology provided by the logistics company.

The technology provided by the company has different features. Therefore, online shops are often difficult to choose the best tracking and tracing information services. The selection process depends on actual requirements such as costs, waiting times, the convenience of use, etc. To measure the performance potential of each technology, it is necessary to evaluate individual technologies that are suitable for daily needs or the selection process can be analyzed using the Unified Theory of Acceptance and Use of Technology (UTAUT). In UTAUT, logistics companies need to pay attention to the technology that is adapted based on performance expectancy, effort expectancy, social influence, and facilitating conditions for consumers to reuse tracking and tracing services (Vankatesh *et al.*, 2003).

Theoretical Background

Since the rise of e-commerce or online retailers, many theoretical models of social psychology information systems have been applied to explain or predict consumer adoption, one of them is Theory of Reasoned Action (TRA) theory, Technology Acceptance Model (TAM), Theory of Planned Behavior (TPB), Motivation Model (MM), a combination of TAM and TPB, PC utilization model, Innovation Diffusion Theory (IDT), and Social Cognitive Theory (SCT) (Sedana & Wijaya, 2009). However, this is still not enough in developing a more comprehensive view (Celik, 2016). UTAUT theory argues that individual intentions towards new technology have four key constructs namely; performance expectancy, effort expectancy, social influence, and facilitating conditions (Venkatesh *et al.*, 2003). According to the model structure, the user's intention to use technology is directly predicted by performance expectancy, effort expectancy,

and social influence, while the intention to use and facilitating conditions directly determines actual use.

Individual differences affect the utilization of technology. Some literature revealed that anxiety in utilizing technology and personal experience with technology has an inverse relationship, in which when the experience in utilizing technology increases, the anxiety level will decrease (Igbaria & Chakrabarti, 1990). It is because experience contributes significantly to the development of self-efficacy perceptions of technology and individuals (Brown *et al.*, 2004; Ong & Lai, 2006; Celik, 2016). Self-efficacy will eventually balance the negative emotional effects on cognitive efforts to process resources for the fulfillment of tasks mediated by technology to generate more expectations (Venkatesh, 2000; Schottenbouer *et al.*, 2004). The theory of acceptance and use in technology is according to the construction of theories and models of technology acceptance (Venkatesh *et al.*, 2003). This model has a variable where PE is performance expectancy, EE is effort expectancy, SI is social influence, FC is facilitating condition, BI is behavioral intention and the latent dependent variable of UB is use behavior (Figure 1)

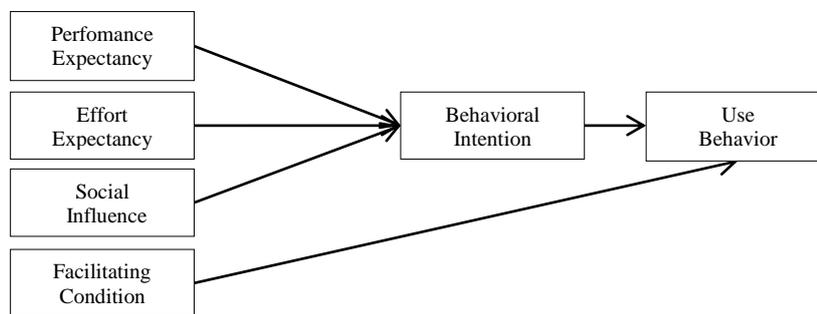


Figure 1. UTAUT Model
Source: Venkatesh *et al.*, 2003

RESEARCH METHOD

Sampling design and data collection

The research samples were online shops selling women's fashion like clothes, pants, skirts, shoes, bags, veils, shirts, etc. That were registered in market places and active users of logistics services. The criteria in the sample were obtained through the results of consumer visits to the stores registered in market places. The results showed the stores that sell women's fashion needs frequently visited by consumers in Indonesia.

Data were collected using a questionnaire survey. Sampling was obtained through checking the online shops regularly at market places, then searching for the contacts of the online shops via Instagram, Facebook, and other social media. The process resulted in contacts of the online shops owner to be approached. The decision to distribute questionnaires to owner of online shops could be considered more in-depth since the owner of the online shops felt the impact of profits and losses directly on their experience using information tracking and tracing services of logistics companies. In total, 207 questionnaires were returning with valid survey respondents.

Measurement

UTAUT model was adopted from previous studies (Venkatesh *et al.*, 2003; Venkatesh & Zhang, 2010; Wu *et al.*, 2012). The research survey was related to the UTAUT model that built PE (performance expectancy), EE (effort expectancy), SI (social influence), BI (behavioral intention), and UB (use behavior). Model construction in this research was defined based on items that had been proposed by Davis (1989); Ajzen (1991); Venkatesh, *et al.*, (2003); and Awwad and Al-Majali (2015).

Performance Expectancy (PE)

Performance expectancy is defined as the level of an individual believe that using the system will help and achieve benefits at work (Venkatesh *et al.*, 2003). PE is related to individual

perceptions about job suitability, usefulness, expected results in using technology (Venkatesh *et al.*, 2003). Based on empirical studies, men tend to be more comfortable with new information systems than women (Venkatesh & Davis, 2002; Venkatesh *et al.*, 2003), but women will use the system more useful than men (Yi *et al.*, 2005). In previous studies, PE shaped the consumer intentions to use a technology (Venkatesh & Davis, 2000; Venkatesh *et al.*, 2003; Zhou *et al.*, 2010).

H1 : Performance expectancy (PE) affecting behavioral intention (BI) in using tracking and tracing services.

Effort Expectancy (EE)

Effort expectancy is the comfort level felt in using a system. According to Venkatesh *et al.*, (2003), EE is the level of ease related to using the system. Three models use the EE concept, including TAM 1 and TAM 2, the complexity of PC use, and ease of use (diffusion of innovation theory). Based on empirical studies, EE is a factor in shaping consumer intention to use technology (Venkatesh & Davis, 2000; Venkatesh *et al.*, 2003; Zhou *et al.*, 2010) and a factor that needs to be considered for its contribution to technology (Orji *et al.*, 2010).

H2 : Effort expectancy (EE) affects behavioral intention (BI) in using tracking and tracing services.

Social Influence (SI)

Social influence is the level where an individual sees the importance of trusting other individuals in using a system (Venkatesh *et al.*, 2003). SI reflects the influence of other individuals' opinions (Zhou, 2011). Based on empirical studies, women are more sensitive to other individuals' opinions (Venkatesh *et al.*, 2003). SI assumes that consumer intention is influenced by people around the environment and the way that person uses the technology (Awwad & Al-Majali, 2016).

H3 : Social Influence (SI) affects behavioral intention (BI) in using tracking and tracing services.

Facilitating Condition (FC)

Facilitating condition is the level where someone believes that organization and technical infrastructure is available for supporting to use of technology (Venkatesh *et al.*, 2003). Venkatesh *et al.* (2003) identified empirically that individual intention and facility condition are two direct determinants of individual behavior, based on Awwad and Al-Majali (2016) FC can also serve as a controller of the influence of actual behavior directly (Al Gahtani *et al.*, 2007; Chang *et al.*, 2007; Venkatesh *et al.*, 2003).

H4 : Facilitating condition (FC) affects the use of behavior (UB) in using tracking and tracing services.

Behavioural Intention (BI)

Behavioral Intention is the possibility of customers to use the company's services that have been used and disseminating positive information about the company to the surrounding environment (Othman *et al.*, 2013; Wu, 2015). The UTAUT proved that BI affects UB in using technology (Venkatesh *et al.*, 2003; Venkatesh & Zhang, 2010).

H5 : Behavioral intention (BI) affects the use of behavior (UB) in using tracking and tracing services.

To test the UTAUT model of this study (Figure 2), indicators built for acceptance in the use of technology of service are based on several previous studies (Martins *et al.*, 2014; Awwad & Al-Majalo, 2015; Tandijaya, 2018) to form the basis for steps adapted if needed for the context of information services (Table 1).

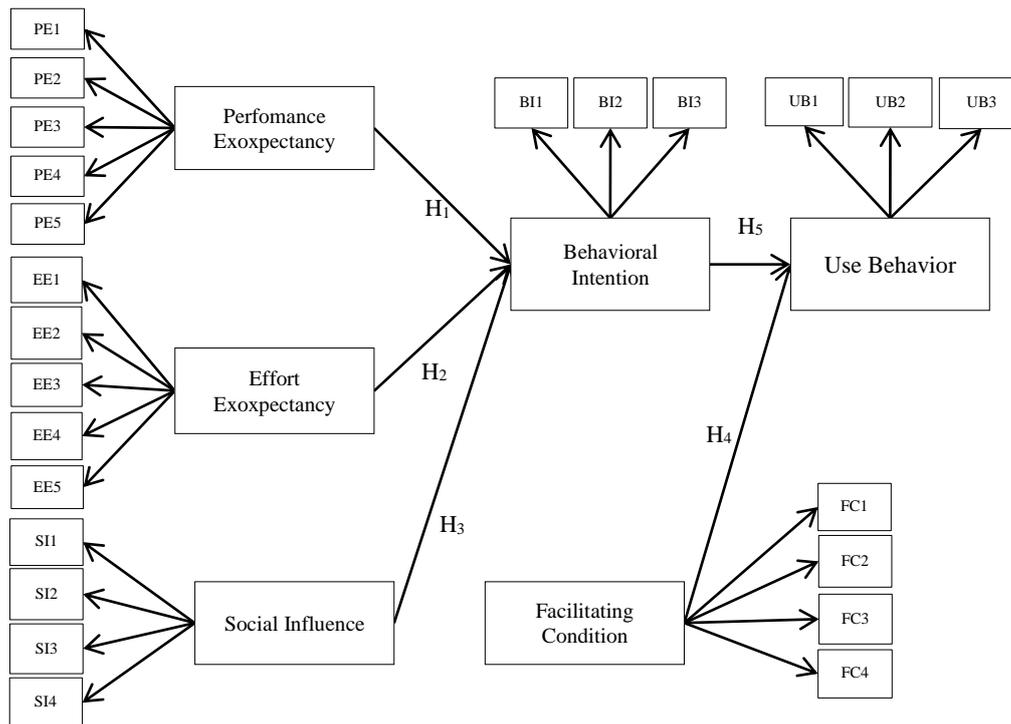


Figure 2. Study Model

Table 1. Indicators of the variables.

| Variable | Indicator | Reference |
|-------------------------------|---|---|
| <i>Performance Expectancy</i> | PE1 1. Tracking and tracing information system can provide complete information | (Davis, 1989; Thompson <i>et al.</i> , 1991; Compeau and Higgins, 1995; Awwad and Al-Majali, 2015) |
| | PE2 2. The tracking and tracing information system can provide fast information | |
| | PE3 3. The tracking and tracing information system can provide accurate information | |
| | PE4 4. Tracking and tracing information system can increase business productivity | |
| | PE5 5. Tracking and tracing information systems have easy to understand features | |
| <i>Effort Expectancy</i> | EE1 6. Tracking and tracing information system can be utilized at any time | (Davis, 1989; Awwad and Al-Majali, 2015) |
| | EE2 7. Tracking and tracing information system can be utilized anywhere | |
| | EE3 8. Tracking and tracing information system is easy to learn | |
| | EE4 9. The capacity of tracking and tracing application | |
| | EE5 10. The amount of money used to use tracking and tracing application | |
| <i>Social Influence</i> | SI1 11. The market place is influential in using the technology | (Davis, 1989; Ajzen, 1991; Thompson <i>et al.</i> , 1991; Venkatesh <i>et al.</i> , 2003; Martins <i>et al.</i> , 2014) |
| | SI2 12. The online shop community is influential in using technology | |
| | SI3 13. Reviews of buyers are influential in using the technology | |
| | SI4 14. Competitors from other online shops are influential in using the technology | |
| <i>Facilitating Condition</i> | FC1 15. There are electronic devices that are facilitated | (Ajzen, 1991; Moore and Benbasat, 1991; Taylor and Todd, 1995) |
| | FC2 16. An easily accessible internet network | |
| | FC3 17. There is a guide in using the technology | |

| Variable | Indicator | | Reference |
|-----------------------------|-----------|---|--|
| <i>Behavioral Intention</i> | BI1 | 18. Will always use the service some time later | (Zeithaml <i>et al.</i> , 1996; Amoah <i>et al.</i> , 2016; Tandijaya, 2018) |
| | BI2 | 19. Will always use to develop marketing strategies | |
| | BI3 | 20. Will recommend services to other online shop communities | |
| <i>Use Behaviour</i> | UB1 | 21. Have used tracking and tracing information system regularly | (Awwad and Al-Majali, 2014; Martins <i>et al.</i> , 2014) |
| | UB2 | 22. Have used services to develop marketing strategies | |
| | UB3 | 23. Have used to evaluate logistics performance | |

Instrument reliability and validity

The research construct had a standard value of factor loading greater than 0,50. Reliability measurement was performed using other alternatives by calculating construct reliability (CR). Values were considered good when the CR value was more than the critical value ($CR \geq 0,70$) (Hair *et al.*, 2010). The validity of the construct was performed using an average where the coefficient value of average variance extracted (AVE) was greater than or equal to the critical value ($AVE \geq 0,50$) (Hair *et al.*, 2010). The results of confirmatory factor analysis (CFA) showed that all constructions exceed the critical values (Table 2).

Table 2. The results of confirmatory factor analysis (CFA)

| Construct | Loadings | AVE | CR | R ² |
|-----------------------------|----------|-------|-------|----------------|
| Performance expectancy (PE) | | | | |
| PE1 | 0,814 | 0,626 | 0,893 | |
| PE2 | 0,872 | | | |
| PE3 | 0,773 | | | |
| PE4 | 0,758 | | | |
| PE5 | 0,731 | | | |
| Effort expectancy (EE) | | | | |
| EE1 | 0,896 | 0,687 | 0,916 | |
| EE2 | 0,931 | | | |
| EE3 | 0,835 | | | |
| EE4 | 0,796 | | | |
| EE5 | 0,661 | | | |
| Social influence (SI) | | | | |
| SI1 | 0,791 | 0,552 | 0,831 | |
| SI2 | 0,726 | | | |
| SI3 | 0,780 | | | |
| SI4 | 0,668 | | | |
| Facilitating condition (FC) | | | | |
| FC1 | 0,846 | 0,651 | 0,848 | |
| FC2 | 0,762 | | | |
| FC3 | 0,810 | | | |
| Behavioral intention (BI) | | | | |
| BI1 | 0,898 | 0,788 | 0,918 | 0,716 |
| BI2 | 0,905 | | | |
| BI3 | 0,860 | | | |
| Use behavior (UB) | | | | |
| UB1 | 0,844 | 0,608 | 0,823 | 0,894 |
| UB2 | 0,767 | | | |
| UB3 | 0,724 | | | |

Model fit

Hair *et al.*, (2010) stated that the index model was used to test the structural model. Table III showed that all indices had a model compatibility values exceeding the level of each general acceptance as suggested in the previous studies. The results of the model fit in this study indicated that the model showed good compatibility with the data collected where the value had greater than standard threshold in this model fit.

Table 3. The goodness of fit indices for the structural model

| Fit indices | Threshold | Value |
|---|-----------|-------|
| GFI (goodness of fit index) | > 0,90 | 0,802 |
| RMSEA (root mean square error of approximation) | ≤ 0,05 | 0,050 |
| NNFI (non-normed fit index) | ≥ 0,90 | 0,985 |
| NFI (normed fit index) | ≥ 0,90 | 0,969 |
| CFI (comparative fit index) | ≥ 0,90 | 0,987 |
| RFI (relative fit index) | ≥ 0,90 | 0,964 |

RESULT AND DISCUSSION

Online shop characteristics

Descriptive analysis regarding the online shop characteristics is presented in Table 4. The results show the percentage of online shop domiciles in the Jabodetabek area (53 percent), the Bandung area (29 percent), and other areas (18 percent). The highest percentage of the age of the owners of the online shops is in the range of 21-25 years (40 percent), while the lowest percentage is <20 years (3 percent). Meanwhile, the percentage of the duration of the established online shops is 1-5 years (52 percent), 6-10 years (26 percent), less than 1 year (21 percent), and more than 10 years (1 percent)

Table 4. Characteristics of Sample

| Characteristic | Frequency | (%) |
|-----------------------------|-----------|-----|
| Domicile of the online shop | | |
| Jabodetabek | 109 | 53 |
| Bandung | 61 | 29 |
| Others | 37 | 18 |
| Age of online shop owner | | |
| 21 – 25 years | 82 | 40 |
| 26 – 30 years | 64 | 31 |
| 31 – 35 years | 30 | 14 |
| 36 – 40 years | 15 | 7 |
| >40 years | 16 | 8 |
| Length of business | | |
| < 1 year | 43 | 21 |
| 1 – 5 years | 107 | 52 |
| 6 – 10 years | 55 | 26 |
| >10 years | 2 | 1 |

The Use of tracking and tracing services

According to online shops, the use of the tracking and tracing services has some functions in several categories. Figure 3 shows the use of the tracking and tracing information services in the logistics companies. The results show that 179 online shops use services to control the arrival of goods to consumers. 175 online shops use services to respond to consumers' complaints. 170 online shops use the services to evaluate the arrival time of the goods to the consumers. 147 online shops use the services to recapitulate the customers who buy the goods in their stores. The last, 128 online shops use the services to evaluate the quantity or volume of shipments in the past year. The results show that approximately 25 percent of online shops do not use the functions of tracking and tracing information services optimally at the logistics company.

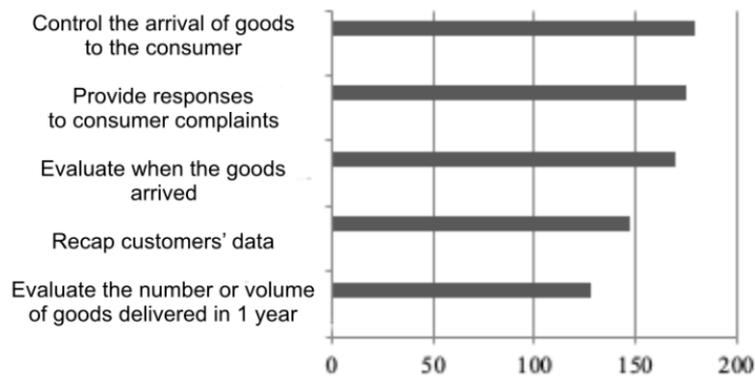


Figure 3. Use of tracking and tracing information services for online shops

Hypothesis Testing

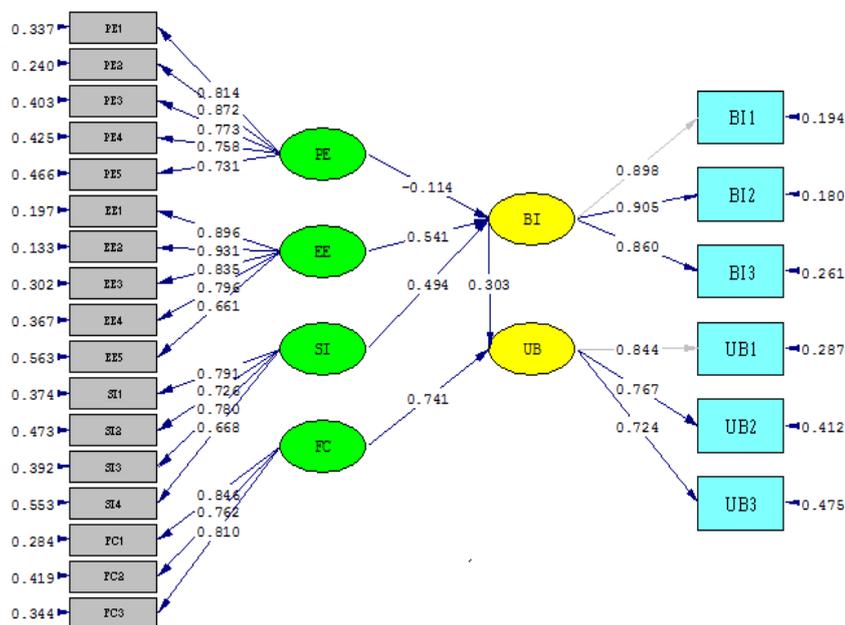


Figure 4. Results of structural model

This research used structural equation modeling (SEM) approach to develop model that represented a causal relation between research variables using LISREL 8.70. Figure 4 and Table 5 represent the results of testing the model.

Table 5. Result of Hypothesis Test

| Hypotheses | | | | β | t -value |
|------------|------------------------|---|----------------------|---------|------------|
| H1 | Performance expectancy | → | Behavioral intention | -0,114 | -1,1015 |
| H2 | Effort expectancy | → | Behavioral intention | 0,541 | 6,288*** |
| H3 | Social influence | → | Behavioral intention | 0,493 | 3,927*** |
| H4 | Facilitating condition | → | Use behavioral | 0,741 | 7,527*** |
| H5 | Behavioral intention | → | Use behavioral | 0,303 | 3,419*** |

The Effect of Performance Expectation (PE) toward Behavioral Intention (BI)

From the result, path coefficient value was -0,114. It showed that the relation between Performance Expectation (PE) with Behavioral Intention (BI) was negative. It means that if the Performance Expectation (PE) increased then Behavioral Intention (BI) would decrease, and vice versa. The relation between the Performance Expectation (PE) and Behavioral Intention (BI) was not significant in the 2-tailed test (t table = -1,96) with a t -count value of -1,015 greater than t table. Thus, H1 was rejected. It means that Performance Expectation (PE) did not significantly

affect Behavioral Intention (BI). These results were in accordance with several studies of Atmojo *et al.* (2016), in his study, the absence of the influence of PE on BI caused an individual's instructional motivation to service providers of products and IT service implementers. It did not give the desire to utilize a knowledge management system (KMS) system to improve their work performance. In addition, research from Putri (2019) states that the insignificance between PE and BI is due to the assumption that there is an application whether or not a user can still conduct transaction activities.

The Effect of Effort Expectancy (EE) toward Behavioral Intention (BI)

As the result, the path coefficient value was 0,541. It showed that the relation between Effort Expectancy (EE) and Behavioral Intention (BI) was positive. It means that if Effort Expectancy (EE) increased, Behavioral Intention (BI) would increase, and vice versa. The relation between Effort Expectancy (EE) and Behavioral Intention (BI) was significant in the 2-tailed test ($t_{table} = 1,96$) with a t-test value of 6,288 greater than t_{table} . Thus, H2 was accepted. It means that Effort Expectancy (EE) significantly affected Behavioral Intention (BI). The effect of EE on BI in using a large effect for online shop on their intention to use information services was in line with the research of Venkatesh *et al.* (2003) and several other inventors such as Sitanggang *et al.* (2017); Foon and Fah (2011); and AbuShanab *et al.* (2010) stated that information services provided by companies were not difficult to use by consumers. This made an individual more comfortable in using the information service because it was flexible.

The effect of Social Influence (SI) toward Behavioral Intention (BI)

From the result, the path coefficient value was 0,494. It showed that the relation between Social Influence (SI) and Behavioral Intention (BI) was positive. It means that if Social Influence (SI) increased, Behavioral Intention (BI) would increase, and vice versa. The relation between Social Influence (SI) and Behavioral Intention (BI) was significant in the 2-tailed test ($t_{table} = 1,96$) with a t-test value of 3,927 greater than t_{table} . Thus, H3 was accepted. It meant that Social Influence (SI) significantly affected Behavioral Intention (BI). The effect of SI on BI had a lower effect compared to EE. Yet, this research was in line with several studies such as Venkatesh *et al.* (2003) and Sitanggang *et al.* (2017). Most online shops stated that the use of information services occurred because of the limitations of the choice of market place. Thus, the effect of intention to use was mandatory.

The Effect of Facilitating Condition (FC) toward Use Behavior (UB)

From the results, path coefficient value was 0,741. It showed that the relation between Facilitating Condition (FC) and Use Behavior (UB) was positive or unidirectional. It means that if Facilitating Condition (FC) increased, then Use Behavior (UB) would increase, and vice versa. The relation between Facilitating Conditions (FC) and Use Behavior (UB) was significant in the 2-tailed test ($t_{table} = 1,96$) with a t-test value of 7,527 greater than t_{table} . Thus, H4 was accepted. It means that Facilitating Condition (FC) significantly affected the Use Behavior (UB). The effect of FC on UB was a big influence for online shop behavior in using the information service. This research was in line with the research of Venkatesh *et al.* (2003) that stated the greatest effect because of the electronic devices used in operating the information service.

The Effect of Behavioral Intention (BI) toward Use Behavior (UB)

Based on the result, path coefficient value was 0,303. It showed that the relation between Behavioral Intention (BI) and Use Behavior (UB) was positive or the same direction. It means that if the Behavioral Intention (BI) increased, the Use Behavior (UB) would increase, and vice versa. The relation between Behavioral Intention (BI) and Use Behavior (UB) was significant in the 2-tailed test ($t_{table} = 1,96$) with a calculated value of 3,419 greater than t_{table} . Thus, H5 was accepted. It means that Behavioral Intention (BI) significantly affected the Use Behavior (UB). The effect of BI on UB was one of the influences on online shop behavior in using the information service in accordance with research conducted by Venkatesh *et al.* (2003) and Atmojo *et al.* (2016). In addition, other factors towards the intention to use the information service was because of the desire of the online shop to improve their business strategies.

Implication

Logistic company needs to develop information service to increase for the online shop to continue to use the information service. The results showed that the lack of online shop behavior in using the information service was because the expectations desired by the online shop were not met by the information service. The presence and absence of tracking and tracing information services at these companies did not affect their buying and selling transactions with their customers (Putri, 2019) or the existence of a tracking and tracing information service that could access all logistic companies making it easier for online shops to use these services. To overcome this obstacle, management at the logistics company in Indonesia must create a way to make an online shop that always checks the goods that have been delivered to the customer. This action can be conducted by means of a bar-code link on the goods with information services. Thus, it will be easy to control each movement of goods. Other advantages besides end consumers, online shops will also know the process where the goods are damaged or lost. This eases online shops to answer complaints from end customers by activating customer service for 24 hours to answer complaints either from online shops or from end customers.

Limitation and Further Research

As in all research, this research also has some limitations. The research was conducted only to online shops that sell women's fashion needs. Therefore, future research needs to be conducted by other fields of online shops that have a very large urgency level. Thus, there is a big possibility that the online shop always controls the position of the goods sent to consumers. The current Research is conducted in Indonesia and there is a lack of reference comparisons with consumers of non-online shop logistics companies. Therefore, further research needs to look at how other consumers' behavior in using information tracking and tracing services is expected to be a difference in behavior between consumers and online shops in using information tracking and tracing services.

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