EVALUATION OF SMARTWATCH USAGE BASED ON THE PERSPECTIVE OF EXPECTATION CONFIRMATION MODEL (ECM), HEALTHOLOGY, HEDONIC, AND HABITS FACTORS

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ABSTRACT. *Smartwatch is a development in the field of wearable technology. Several studies have specifically discussed the characteristics that can increase continuance intention in using a smartwatch. The purpose of this study is to analyze the use of smartwatch hardware that is integrated with supporting applications based on the perspective of the Expectation Confirmation Model (ECM), healthology, hedonic, and habits factors to explain the intentions of the continuance of the smartwatch. Based on 170 samples collected from JABODETABEK areas, this study found that the perceived usefulness of using a smartwatch will increase user satisfaction, so this can represent user expectations and it can increase the intentions of the continuance of the smartwatch. Additional analysis revealed that healthology and habits play an important role in the intentions of the continuance of the smartwatch. The results of this study state that hedonic factors do not have a significant effect on continuance intention.*
Keywords: Smartwatch, Expectation Confirmation Model (ECM), Healthology, Hedonic, Habits, Continuance intention

1. **Introduction.** The very rapid development of information technology today has triggered the birth of various benefits that can be used to meet human needs. In technology development, multidisciplinary perspectives are important in the organization, processing, and managing knowledge sources for innovation [9].

Along with the development of the digital world today, many things allow it to be controlled from various places via the Internet network that can be accessed using smartphones and other gadget devices. Now the Internet network is very easy to find and this is very helpful for human mobility in carrying out various daily activities. A simple example is that by using a smartphone that has an Internet network, you can easily send messages to various places using email. Also, you can also access various websites, applications, and transact online, so this shows that it has entered the era of the digital economy.

The use of technology, especially information technology and computers, from time to time allows humans to be facilitated in their work, such as controlling electronic equipment remotely using the Internet media or better known as IoT (Internet of Things). Burange and Misalkar said that IoT (Internet of Things) can expand Internet connectivity such as laptops, desktops, and smartphones to various devices that exist in everyday life to be able to communicate and interact with the external environment via the Internet [4].

The application of the Internet of Things (IoT) in this global era, which is supported by various technological advances, has led to various discoveries. At this time, the watch experienced the development of modification into a communication tool known as smartwatches. Apart from being a communication tool, smartwatches also have various functions in terms of receiving notifications, listening to music, tracking exercises, and chatting with friends [8].

Recently, technology can accommodate human activities, such as to fulfill their communication needs, as a result many people spending their time using gadgets, so that they do less physical activity. Spending time outdoors and participating in physical activity can improve mental health [1]. By using a smartwatch, someone can get easy information if they lack physical activity through daily notifications. This is what makes [6] propose the term healthology or a combination of health and technology because more and more smartwatches can motivate someone to stay healthy.

In addition, this smartwatch can access various supporting applications and users can easily get various information by accessing the Internet on the smartwatch. The easier information on the Internet allows users to get advertisements with various attractive promos that lead to being consumptive. The utilitarian and hedonic value of smartwatch use plays an important war in customer continuation intentions [7].

Smartwatches create new habits in the use of watches in general, and smartwatches can provide notifications on the user's wrist without the need for smartphone assistance. Therefore, the habit becomes a strong factor affecting the continuing intention to use smartwatches [3].

Based on the phenomenon in the paragraphs that have been described related to the effect of using a smartwatch, it can be seen that the variables are that the effect of using a smartwatch can enable a person to be more active in monitoring their health by using technology products or the term healthology. In addition, the effect of smartwatch use has a hedonic value in the customer's continuing intention to use a smartwatch. Next, the effect of using smartwatches creates new habits in watch use. Therefore, this study was conducted to answer the facts related to the effect of using smartwatch hardware integrated with its supporting applications based on the perspective of the Expectation Confirmation Model (ECM), and factors of healthology, hedonic, habit that have not been explored before from the study. The authors limit the research problem variables so that research can be carried out more deeply and perfectly by combining research models based on previous literature reviews.

To the best of the authors' knowledge, the topic of smartwatches in the context of continuous use of information systems has not been studied enough. Based on the Expectation Confirmation Model (ECM) combined with healthology, hedonic, and habit factors, this study describes the use of smartwatches in terms of health, hedonism, and habits. The result can describe usefulness and satisfaction variables that can influence the effect on continuance intention. This proves that using a smartwatch that has a variety of functional and stable options will make users get satisfaction in using a smartwatch. Therefore, it will increase the user's continuation intention.

2. **Method.** This study uses the theoretical basis of the Expectation Confirmation Model (ECM) because smartwatches are included in the information system product category and this theory helps to understand the effect of one's use in using a smartwatch. Bölen

stated that perceived usefulness and confirmation have a positive impact on user satisfaction, and the intention of continuing information systems is influenced by user satisfaction and perceived usefulness [3]. Perceived usefulness is a cognitive belief, and satisfaction reflects the influence of users, then confirmation is a new construction in continuance intention research, if the confirmation has a greater effect, then this proves that users have high expectations of the use of information systems [2].

According to defining the result more comprehensively, this research breaks down the research model into nine hypotheses, which are

1) H_1: The Confirmation (C) variable has a significant effect on the Perceived Usefulness (PU) variable.
2) H_2: The Confirmation (C) variable has a significant effect on the Satisfaction (S) variable.
3) H_3: The Perceived Usefulness (PU) variable has a significant effect on the Satisfaction (S) variable.
4) H_4: The Perceived Usefulness (PU) variable has a significant effect on the Continuance Intention (CI) variable.
5) H_5: The Satisfaction (S) variable has a significant effect on the Continuance Intention (CI) variable.
6) H_6: The Hedonic (HD) variable has a significant effect on the Perceived Usefulness (PU) variable.
7) H_7: The Hedonic (HD) variable has a significant effect on the Continuance Intention (CI) variable.
8) H_8: The Healthology (HL) variable has a significant effect on the Continuance Intention (CI) variable.
9) H_9: The Habit (HB) variable has a significant effect on the Continuance Intention (CI) variable.

3. **Discussion.** The data from this study can be declared to have met the requirements of the convergent validity test. After testing the construct validity, the next test is the construct reliability test using Composite Reliability (CR). The construct is declared reliable if the Composite Reliability (CR) value is $\rightarrow 0.7$. After testing using Composite Reliability (CR), the next test is the construct reliability test using Cronbach's Alpha (CA). The construct is declared reliable if the Cronbach's alpha (CA) value is $\rightarrow 0.7$.

With path coefficients, this study can determine the influence between variables whether it has a direct or indirect effect on each variable.

3.1. **Confirmation to perceived usefulness.** Based on Table 1 with the value of t-statistics 8.481 which means $\rightarrow 1.96$, then H_1 is accepted, which means that confirmation affects perceived usefulness, meaning that if confirmation increases, there will be an increase in perceived usefulness and statistically has a significant effect. Based on the results, it is known that the confirmation path coefficient value for perceived usefulness is 0.603, which means that the confirmation has a positive relationship to perceived usefulness. This variable is used to confirm whether there is a match between the expectations of smartwatch users and the benefits felt by users in using the smartwatch. Therefore, for smartwatch manufacturers, it is very important to pay attention to user needs in terms of providing various applications that can be used by users according to user needs.

3.2. **Confirmation to satisfaction.** Based on Table 1 with the value of t-statistics 5.908 which means $\rightarrow 1.96$, then H_2 is accepted, which means that confirmation has an effect on satisfaction, meaning that if confirmation increases, there will be an increase in satisfaction and statistically has a significant effect. Based on the results, it is known that the confirmation path coefficient value is 0.502, which means that the confirmation has a positive relationship with satisfaction. This variable is used to confirm if there is a match

TABLE 1. Path coefficients

Relation	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
C → PU	0.603	0.597	0.071	8.481	0.000
C → S	0.502	0.499	0.085	5.908	0.000
PU → S	0.365	0.361	0.081	4.487	0.000
PU → CI	0.169	0.160	0.084	2.027	0.043
S → CI	0.166	0.162	0.068	2.443	0.015
HD → PU	0.291	0.295	0.074	3.945	0.000
HD → CI	0.090	0.101	0.103	0.873	0.383
HL → CI	0.156	0.156	0.050	3.126	0.002
HB → CI	0.440	0.442	0.060	7.391	0.000

between the expectations of smartwatch users and the satisfaction obtained by users in using a smartwatch. Therefore, smartwatch manufacturers need to provide adequate service centers, because with so many service centers, users feel safe and comfortable if their smartwatch is damaged. This makes users feel satisfied when using a smartwatch.

3.3. **Perceived usefulness to satisfaction.** Based on Table 1 with the value of t-statistics 4.487 which means → 1.96, then H_3 is accepted, which means that perceived usefulness affects satisfaction, meaning that if perceived usefulness increases, there will be an increase in satisfaction and statistically has a significant effect. Based on the results, it is known that the value of the perceived usefulness path coefficient on satisfaction is 0.365, which means that perceived usefulness has a positive relationship with satisfaction. This variable is used to determine whether the use of a smartwatch has benefits for users so that users get satisfaction from using the smartwatch. This proves that the benefits felt in using a smartwatch will make users feel satisfied. Smartwatch manufacturers must know which functions the user prefers so that smartwatch users get satisfaction from the functions provided.

3.4. **Perceived usefulness to continuance intention.** Based on Table 1 with a value of t-statistics 2.027 which means → 1.96, H_4 is accepted, which means that perceived usefulness affects continuance intention, meaning that if perceived usefulness increases, there will be an increase in continuance intention and statistically has a significant effect. Based on the results, it is known that the path coefficient value for perceived usefulness on continuance intention is 0.169, which means that perceived usefulness has a positive relationship with continuance intention. This variable is used to find out how much benefit the user feels in using a smartwatch, because if the benefits felt by the user are quite a lot, the greater the user's intention to continue using the smartwatch.

The variable perceived usefulness had a significant effect on the variable continuance intention [10]. This proves that by providing a wide selection of good and stable applications and quite a lot of functionality, it can give users the many benefits they get from using a smartwatch. This can increase users to continue using the smartwatch.

3.5. **Satisfaction in continuance intention.** Based on Table 1 with the value of t-statistics 2.443 which means → 1.96, H5 is accepted, which means that satisfaction affects continuance intention, meaning that if satisfaction increases, there will be an increase in continuance intention and statistically has a significant effect. Based on the results, it is known that the coefficient value of the path of satisfaction with continuance intention is 0.166, which means that satisfaction has a positive relationship with continuance intention. This variable is used to measure the satisfaction level of smartwatch users because

if the level of user satisfaction in using a smartwatch is high enough, it causes the user to continue using the smartwatch. This proves that smartwatch manufacturers must pay attention to the efficiency level of smartwatch use in users' daily activities, because if users feel helped in carrying out their daily activities, then users feel they get satisfaction in using the smartwatch, and this increases the user's continued intention.

3.6. **Hedonic to perceived usefulness.** Based on Table 1 with the value of t-statistics 3.945 which means $\rightarrow$ 1.96, then H_6 is accepted, which means that hedonic affects perceived usefulness, meaning that if hedonic increases, there will be an increase in perceived usefulness and statistically has a significant effect. Based on the results, it is known that the hedonic path coefficient value for perceived usefulness is 0.291, which means that hedonic has a positive relationship to perceived usefulness. This variable is used to describe how much influence the user's pleasure has on the perceived benefits of using a smartwatch, because if the user gets high pleasure from using a smartwatch, then the user will feel that he gets many benefits from using a smartwatch.

The hedonic variable has a significant effect on the perceived usefulness variable [12]. This proves that smartwatch manufacturers must consider that smartwatch users need entertaining features in using a smartwatch such as game applications. By making users feel entertained, users feel that using a smartwatch will get many benefits.

3.7. **Hedonic to continuance intention.** Based on Table 1 with the value of t-statistics 0.873 which means $\leftarrow$ 1.96, H_7 is rejected, which means that hedonic has no significant effect on continuance intention, meaning that if the hedonic increases, there will be no major change in continuance intention and statistically it has no significant effect. Based on the results, it is known that the coefficient value of the hedonic path to continuance intention is 0.090, which means that hedonic has a positive relationship with continuance intention. This variable is used to determine how much influence the user's pleasure and enjoyment have on the intention to use the smartwatch sustainably.

The hedonic variable does not have a significant effect on the continuance intention variable [11]. This happens because the smartwatch is not the main factor for users to get fun and enjoyment. This is also based on the profile of the smartwatch user respondents, most of whom have an age range of 26-45 years, in this age range can be categorized as adults. In general, based on observations of most adults, his thought patterns do not take pleasure and enjoyment the main thing in living life. Most adults in using smartwatches prioritize health matters compared to entertainment such as playing games. Therefore, in using a smartwatch for daily activities, the hedonic variable has not been able to influence the continuance intention variable.

3.8. **Healthology to continuance intention.** Based on Table 1 with the value of t-statistics 3.126, which means $\rightarrow$ 1.96, H_8 is accepted, which means that healthology affects continuity intention, meaning that if healthology increases, there will be an increase in continuance intention and statistically has a significant effect. Based on the results, it is known that the coefficient value of the healthology pathway to continuity intention is 0.156, which means that healthology has a positive relationship to continuity intention. This variable is used to determine the extent to which users utilize technology by using a smartwatch in carrying out various activities about health.

The healthology variable has a significant influence on the continuance intention variable [6]. This proves that although the various functionalities provided by the smartwatch manufacturer are quite numerous and liked by users. The healthology feature plays an important role in increasing the user's continuation intention.

3.9. **Habit to continuance intention.** Based on Table 1 with a value of t-statistics 7.391, which means $\rightarrow$ 1.96, H_9 is accepted, which means that habit affects continuance

intention, meaning that if habit increases, there will be an increase in continuance intention and statistically has a significant effect. Based on the results, it is known that the coefficient value of habit paths on continuance intention is 0.440, which means that habit has a positive relationship to continuance intention. This variable is used to determine the extent to which the user repeatedly performs an action using a smartwatch in carrying out various activities, because if the user is accustomed to technology, the greater the user's intention to continue using it. This proves the importance of manufacturers explaining to users that smartwatches can make a real difference and help increase mobility and efficiency in users' daily activities. This will make it a habit for users to use the smartwatch for their routines and increase the user's continued intention.

4. **Conclusions.** The wearable technology industry according to [5] is one of the fastest-growing markets in this decade. With the increasing consumer demand for wearable technology, there is a possibility that it will encourage various smartwatch companies to develop their products to suit consumers' needs to increase users' continued intentions in using smartwatches. This will have a positive impact on the company in increasing the value of profits. Users also feel that using a smartwatch can help with certain tasks such as maintaining sleep patterns so that this can increase the user's continued intention to use the smartwatch. Therefore overall, in this study, it is evident that including healthology and habit variables into the Expectation Confirmation Model (ECM) framework will add predictive power in the user's continuing intention.

Based on the results of this study, there is one variable that does not have a significant effect on continuance intention, namely the hedonic variable. From these results, the authors propose to smartwatch companies to improve quality and provide various features that focus on consumer needs in terms of getting fun, having fun, and increasing curiosity. In addition, the authors hope for further researchers to ask the respondents the types and prices of smartwatches to find out more about the smartwatch user profile.

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