FACTORS AND THEORIES FOR E-COMMERCE ADOPTION: A LITERATURE REVIEW

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ABSTRACT

The development of technology presents e-commerce as an alternative buying and selling place beside the offline shopping center. The growth of e-commerce globally confirms people's acceptance of e-commerce presence. Various theories of technology acceptance have been formulated to determine the factors that drive technology acceptance. The evolution of technology acceptance theory aims to overcome the problem of technology acceptance from various factors. The acceptance of e-commerce is interesting to learn as a reference to determine the right strategy in the future. This study aims to classify the journey of technology acceptance in e-commerce so that it can show the driving factors for the acceptance of e-commerce in the future. This study uses a literature review approach to the use of UTAUT theory in e-commerce. UTAUT technology acceptance theory is a combination of various previous theories. In general, technology acceptance theory uses an approach that is felt by humans. This study reveals that the technological dimension in resolving humanity is an important factor in technology acceptance. Changes in the e-commerce phase play a role in determining the factors that drive their acceptance of the community. Trust becomes an important factor at the beginning of the introduction phase of e-commerce. Meanwhile, user experience as part of the technological dimension becomes an important factor in the determination phase of e-commerce based on its market. The novelty of this research is to offer the development of technology acceptance factors on UTAUT theory. The practical contribution of research as a reference for management in the preparation of future e-commerce strategies through supporting factors for technology acceptance.

Keywords: e-commerce, UTAUT, trust, technology dimension, user experience

1. INTRODUCTION

E-commerce is a technology product that has been successfully accepted by the public. The internet revolution has led to the advancement of online business throughout the world [1]. E-commerce allows consumers to shop online easily, anytime, using a secure payment system; furthermore, trust in online store sites is very important for consumers   [2]. The relatively easy deployment and use of the internet and other

technological support enable e-commerce to grow exponentially due to reduced costs, increased efficiency, and improved customer service [3] [1] [4]. Ease of access in shopping is in line with the ease of customers to compare products and switch to other e-commerce. This ease has the effect of shifting competition patterns and e-commerce sustainability [5][6]. E-commerce increases the availability of information, not only for consumers but also for competitors where they can identify and improve product innovation. As such, the Internet itself is changing traditional business rules and forming new ways to compete for [7][1]. The growth of e-commerce is increasingly supported by the internet revolution [8][9]. From 2014 to 2019 e-commerce has grown by 30% and will continue to grow in predictions until 2023 [8]. In line with market acceptance of e-commerce, practitioners, and researchers explore more deeply about e-commerce [10] [11]. Complementing the journey of e-commerce, scientists have contributed to providing solutions to e-commerce problems through various theories of technology acceptance. This phenomenon is increasingly interesting with the evolution of theories that signify the dynamics of e-commerce. This theory is adapted to be able to provide answers to problems that change over time. Various studies in leading journals discuss e-commerce and the theory of technology adoption. E-commerce offers many conveniences for its users [2]. Lots of successful e-commerce news like Amazon, Ali Baba, eBay, Jingdong [12], but that does not mean there is no e-commerce failure. In fact, many e-commerce sites must be closed because they cannot survive [13][14]. On the other hand, there is e-commerce success, but the results are not as much as expected [10]. Forbes Magazine released a factor that caused start-up failure [15] among them is the decrease in the intensity of use that causes e-commerce is not sustainable.

Given the importance of the issue of sustainability as an impact of e-commerce competition, there is a need to know trends in the factors that support e-commerce acceptance. This study aims to classify the journey of technology acceptance in e-commerce so that it can show the driving factors for the acceptance of e-commerce in the future. Formulating the right strategy in accordance with the factors driving the acceptance of e-commerce can increase the sustainability of e-commerce [16]. This study uses a literature review approach to the use of UTAUT theory in e-commerce. In general, this literature review study discusses the Post Acceptance phase, in the latest form of e-commerce evolution (B2b B2C, etc.). Reference selection is limited to the 1995-2019 range with a focus on the intensity of use so that the sustainability of e-commerce is maintained. The 1995 election with the consideration of the introduction of e-commerce such as Amazon and eBay [17], [18]. In the end, the development trend of technology acceptance theory towards e-commerce can be confirmed through the factors offered for the development of technology acceptance theory.
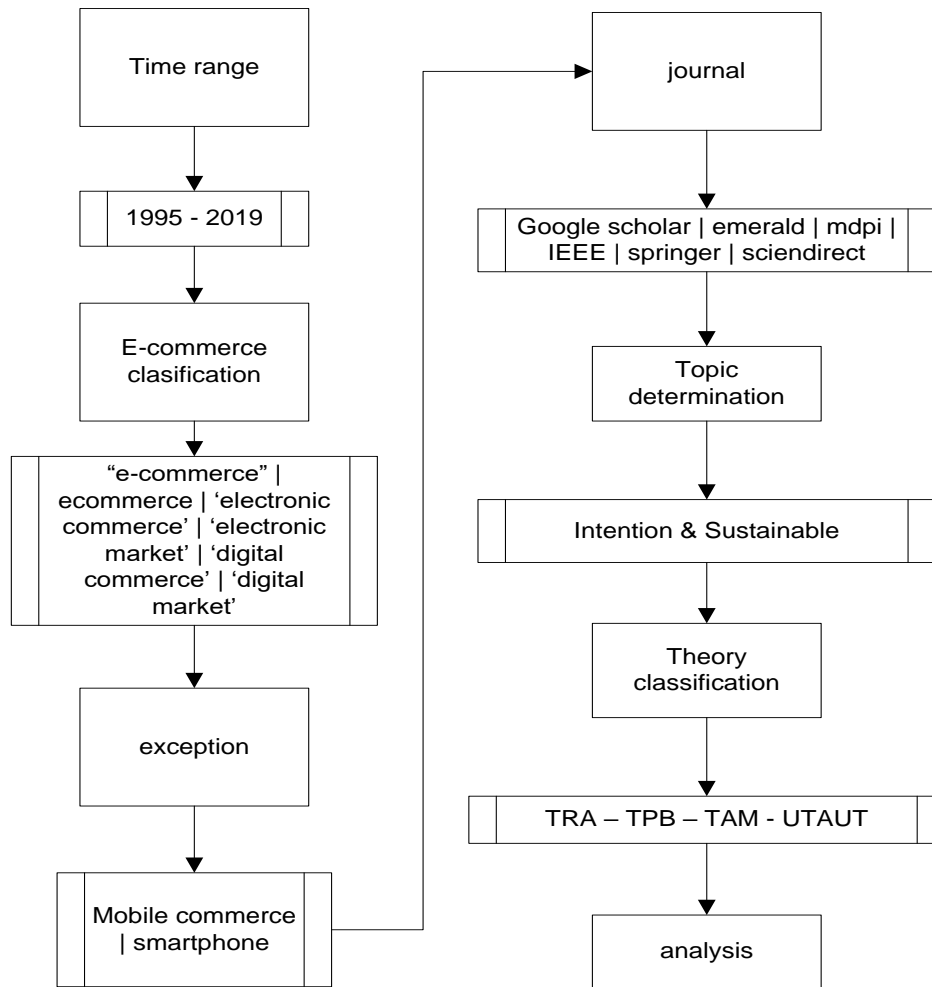
Figure 1. Methodology

2. LITERATURE REVIEW

2.1 Intention and Perceived Human

E-commerce competition increases in line with its growth. The intensity of the use of e-commerce is expected to be maintained [2][19][20]. Many studies on the intensity of e-commerce use from various perspectives, but there is a lack of research with a comprehensive view [10]. For this reason, the search for literature has focused on intentions and sustainability by including the use of factors that drive technology acceptance in the evolution of technology acceptance theories. In general, the intensity of the use of this system is in line with human acceptance. The acceptance which in this research is defined as the perceived value (human side) has been considered as key in marketing by the company [21].

Human acceptance has been widely discussed in various branches of marketing research [22]. Customer service preferences or purchase intent can be determined by checking this acceptance. Further development, acceptance becomes a differentiator to maintain competitive advantage [23]. The significance of acceptance is based on the value of the product or service felt by the customer [24], which can be defined as the exchange between perceived benefits and perceived costs [25]. Empirically validated

that the intention to continue IS is a significant predictor of continuing IS use [26][27][28]. According to research after IS adoption, the perceived benefits of IS are the main determinant of the ongoing intention to use the system [29]. With the intensity of the use of sustainable e-commerce, it is expected that the sustainability of e-commerce can be maintained [16][21].

2.2 Adoption Technology Theory

Scientists have developed various theoretical methods to explore technology adoption and determine factors in dealing with new technologies/applications [30][31][32][33]. The dominant model has been widely used in the last decade, such as the theory of reasoned action (TRA) [30], technology acceptance model (TAM) [31], the theory of planned behavior (TPB) [32], and integrated theories of technology acceptance and use (UTAUT) [33]. In general, these models have in common that use can be predicted with the intention to use. The theory of technology adoption has evolved as an adjustment to emerging problems. The TRA was formulated by Ajnen [30], It has been proven to be adequate in predicting behavior, but along with the change/dynamics of the problem, it turns out the conclusion was found that TRA only applies to behavior that is under the full control of the individual because there are factors that can hinder or symbolize the realization of intention into behavior. The addition of perceived behavioral control factors (PBC) changes TRA to the Theory of Planned Behavior (TPB) [32]. UTAUT is a theory that integrates 8 other theories [34] [16] [35] [36]. Venkatesh et al. (2003) testing the theory of technology acceptance by system users, these theories are: (1) reasoned action theory (TRA), (2) technology acceptance model (TAM), (3) Motivation model (MM), (4) planned behavior theory (TPB), (5) Combined TAM and TPB models (combining technology acceptance models and planned behavior theory or TAM + TPB)), (6) PC utilization model (MPCU), (7) Innovation diffusion theory (IDT), and (8)) Social cognitive theory (social cognitive theory or SCT).[35] Then the theories are combined into a new integrated model. This integrated model is then called the combined theory of technology acceptance and use (UTAUT).[37] The main determinant influences the intended use effect from the perspective of new technology, which can be determined by three constructs including performance expectations, business expectations, and social influence. Performance expectations are defined as the extent to which a person believes that using the system will help them achieve results in job performance [35], while business expectations can be defined as the level of comfort associated with the use of technology by consumers which explains the individual's perception of the level of difficulty or ease of using IT systems [35] as well as being a predictor for individual intentions to use IT [38]. Social influence is the extent to which individuals perceive certain levels of behavior with important references (for example, family and friends) so they must use certain technologies [39]. In addition, Venkatesh, et al. [35] shows that facilitating conditions and behavioral intentions also have a direct effect on user behavior. Facilitation conditions are defined as the level at which an individual believes that organizational and technical infrastructure exists to support the use of the system [39]. Also, there are four individual characteristics including gender, age, experience, and voluntary use as a moderator of the UTAUT model [35]. However, moderation variables were not mentioned in this study. UTAUT has been used to explain behavioral intentions and is used in various information technology contexts such as e-m-government services [38], e / mobile banking payments [40] [41] [42] [43], mobile technology [44], and transportation system [45] [46]. The UTAUT model has been

applied to explore the context of adopting transit fee payment technology, as seen in Wu, et al. [45] where the UTAUT model was adopted to investigate citizen acceptance and use of iPass transit smart cards in Taiwan's MRT system. The results showed that most of the UTAUT constructions had a strong positive influence on behavioral intention. Facilitation conditions as one of the determining factors that influence the intention to use Spider Cards and have a positive influence on technology adoption and intentions [39] [37]. In general, UTAUT focuses on the intensity of the use of technology in terms of human behavior. In this study there are variables proposed to complement the perspective of the intensity of the use of technology in this case e-commerce, these variables are constantly used by researchers for the success of e-commerce, namely from the technology domain [47] [48] [49] [50] [16].
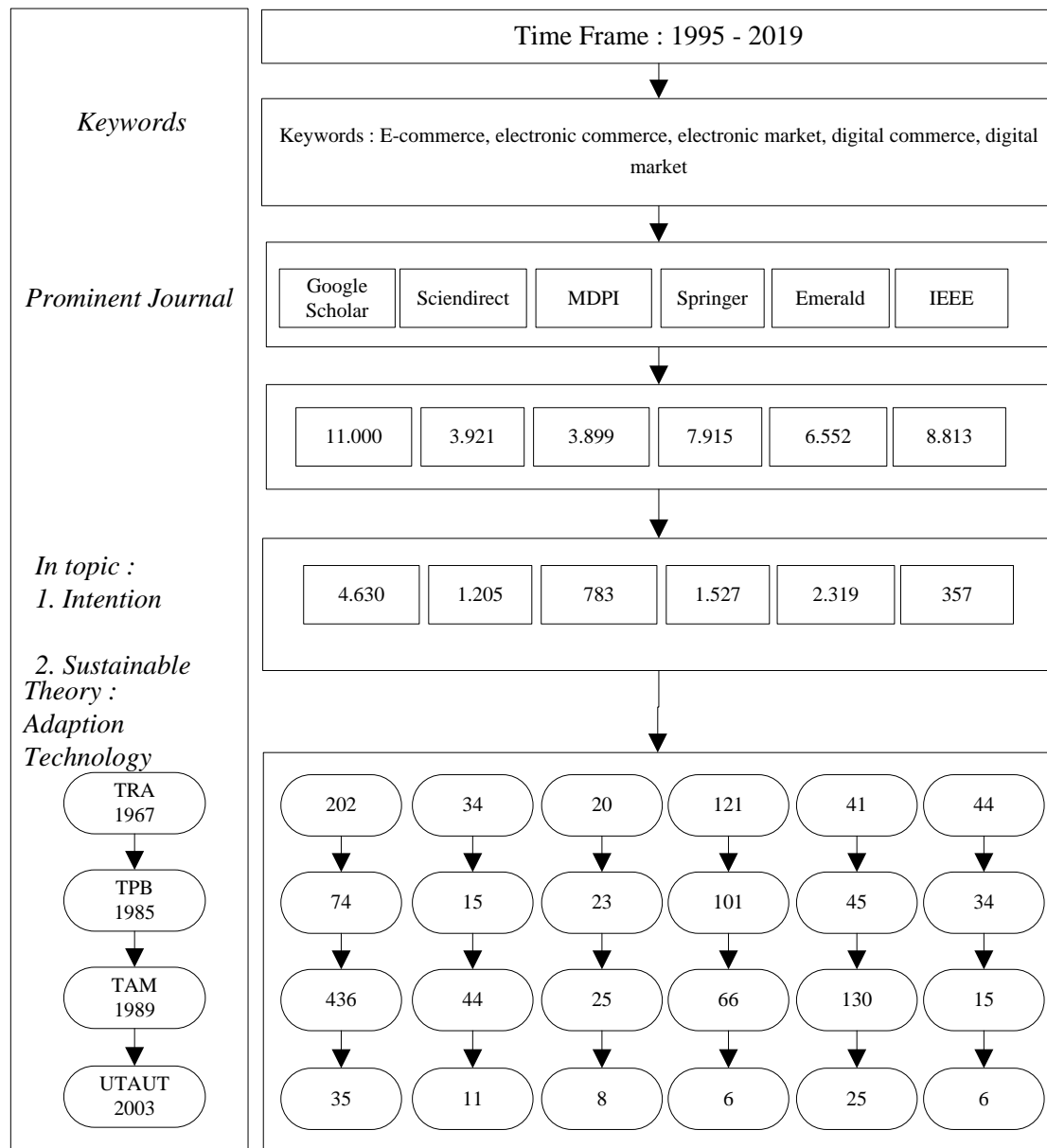

Figure 2. Classification

3. METHODOLOGY

The process of searching e-commerce literature began in 1995 since e-commerce began to be introduced [17], [18]. The search in this study uses Google Scholar using the keywords "e-commerce" or "e-commerce", "digital market", "online trading", "electronic market", "sustainable", "intention". E-commerce research field with publication time 1995 - 2019. The Election in 1995 with the assumption that Amazon as the pioneer of e-commerce was first introduced. First, article search uses the google scholar site. The search focuses on e-commerce, not on the device used. This research uses leading journal sources including   ScienceDirect, Springer, IEEE, Emerald, and MDPI. The stages of classifying the literature in this study can be illustrated in Figure 1. research focuses on the e-commerce of consumer goods (such as clothing, cell phones, general household goods, equipment, etc.).   But not factory equipment items such as boilers, machinery, mechanics, dangerous goods, etc. This research does not discuss the use of certain devices. Furthermore, the classification of articles is focused on certain topics, namely intensity, and sustainability. This is in line with increasing competition in e-commerce. Intensity and sustainability become interesting topics to be studied as management efforts to maintain e-commerce [2][19][20]. Furthermore, the classification is based on the theory of technology adoption that has been developed by scientists since the 1970s. This classification of research is called using the basic theory of technology acceptance theory. In general, the theories presented in this study are TRA, TPB, TAM, and UTAUT. Figure 2 shows an evaluation of the theory of technology adoption used in this study. A more in-depth study was carried out on UTAUT theory as the latest theory which currently combines previous theory. Furthermore, the variable classification is used to answer the problem raised in each article. Classification of literature reviews (topics of intensity and sustainability, the theory of technology adoption) is sought based on the keywords in the article and then an analysis is carried out to determine the suitability of the contents of the article with the classification needed. The analysis is carried out to find new variables and key variables that appear to complement the use of theory in answering problems in research that might not be answered based on existing variables.

4. RESULT and DISCUSSION

This study uses a literature review approach. In general, the stages of theory evolution are illustrated in Figure 3. Based on the picture, it can be concluded that when new problems arise that are not accommodated in the existing theories, the evolution of the next theory occurs. The eight leading theories united in UTAUT [34] [16] [35] [36] are the theory of reasoned action (TRA), technology acceptance model (TAM), motivational model (MM), the theory of planned behaviour (TPB), combined TAM and TPB, the model of PC utilization (MPTU), innovation diffusion theory (IDT) and social cognitive theory (SCT). Partial research with the adoption of certain theoretical models is widely used by researchers [51]. The majority of e-commerce research uses the theory of technology adoption in TAM, TPB and UTAUT [52] [53] [54] [55] [56] [57] [58][59][60]. Figure 2 explains the classification of e-commerce according to the theory it uses. The use of UTAUT theory is not as many as other theories, this is because UTAUT was known in 2003 and UTAUT 2 in 2012 [33], newer than other theories. However, the use of this theory has dominated research in recent years [61] [62][63][64][65]. This also confirms the claim that UTAUT is a refinement of the previous theory [65][66]. This research focuses on UTAUT theory on the intensity and

sustainability of e-commerce because of new theories and research trends that have adopted this theory in recent years. However, in fact, many studies often find additional factors and variables outside the theory used to combine theory with other variables outside the theory. It can be assumed that the use of variables in the original theory is not enough to answer the problem in research. Table 1 presents variable classifications based on theory and Table 2 presents additional variables in acceptance theories proposed in several studies. The phenomenon of changing stages of e-commerce affects the use of acceptance variables in e-commerce. The initial phase of e-commerce is the introduction to the community with efforts to ensure the existence of e-commerce. "Trust" is an important factor in accepting e-commerce as a buying and selling alternative after a physical store. However, after e-commerce has become famous and more mature, the convincing stage of e-commerce has been completed. "Trust" is inherent in e-commerce systems. Naturally, e-commerce that does not get public trust will not exist until now. However, further research needs to be done to uncover the relevance of using the variable "Trust" as an independent variable in e-commerce. "Trust" is embedded in the system and "Trust" is a factor that influences e-commerce transactions [67][10] open research space to reveal the reliability of variable trust in e-commerce today. In terms of technical dimensions, the User Interface and User experience are now an important part of online business [68]. The User Interface focuses on the appearance of beauty such as uniformity and good consistency including fonts, colors, images, and other attractive visual shapes so that visitors feel at home for a long time and want to reuse [69]. Whereas the User Experience design is used to increase user comfort and satisfaction. Based on this definition, the design cannot be separated from the User's definition Interface and User Experience.

Table 1. Classification of variables based on acceptance theory

Technology Acceptance Theory	Variable
TRA (theory of reasoned action)	1. Behaviour 2. Attitude 3. Subjective Norm. 4. Behaviour Intention 5. Condition
TPB (Theory of Planned Behavior)	1. Normative beliefs and subjective norms 2.Control beliefs and perceived behavioural control 3. Behavioural intention and behaviour 4. Conceptual / operational comparison
TAM (theory acceptance Model)	1. Perceived usefulness 2. Perceived ease of use 3. Attitude toward using 4. Behaviour Intention 5. Action system
UTAUT (Unified Theory of Acceptance and Use of Technology)	1. Performance Expectancy 2. Effort Expectancy 3. Social Expectancy 4. Facilitating Expectancy

Table 1. Classification of variables based on acceptance theory (cont.)

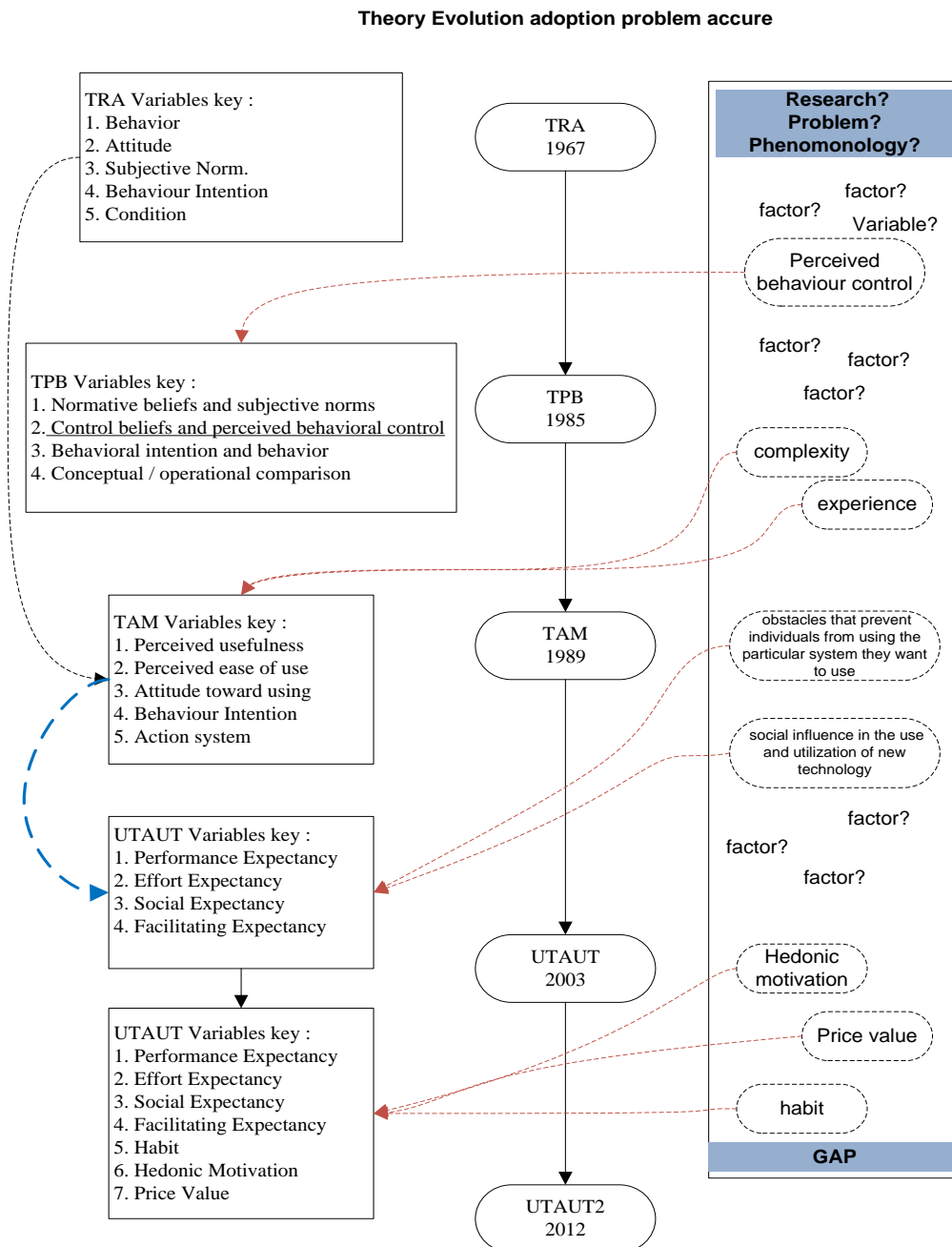| Technology Acceptance Theory	Variable
UTAUT 2	1. Performance Expectancy 2. Effort Expectancy 3. Social Expectancy 4. Facilitating Expectancy 5. Habit 6. Hedonic Motivation 7. Price Value

Theory Evolution adoption problem accure

Figure 3. Theory Evolution

Table 2. Variable of Theory adoption Technology

No	Variable	Domain	References
1	Attitude	TRA, TAM	[71] [53] [72] [52] [73] [74] [75] [61]
2	Subjective Norm.	TRA, TPB	[75]
3	Behaviour Intention	TRA, TPB, TAM	[52] [53] [54] [55] [56] [57] [58][59] [60] [76] [29] [27][77] [78] [74] [61] [62] [63] [64] [65] [79] [66][80] [81] [82] [83][73] [84] [85]
4	Perceived usefulness	TAM	[86] [72] [87] [86] [73] [27] [88] [89] [90] [74] [61] [64]
5	Perceived ease of use	TAM	[52] [72] [87] [86] [73] [71] [74] [61]
6	Performance Expectancy	UTAUT	[53] [54] [55] [84] [85] [57] [78] [60] [88] [77] [64] [65] [79] [66] [81] [82] [83][62]
7	Effort Expectancy	UTAUT	[53] [54] [55] [84] [85] [57] [78] [60] [88] [77] [62] [64] [65] [79] [66] [81] [82] [83]
8	Social Expectancy	UTAUT	[53] [54] [91] [55] [56] [84] [85] [57] [78] [60] [88] [77][62] [63] [64] [65] [79] [66] [81] [82] [83]
9	Facilitating Expectancy	UTAUT	[54] [55] [84] [85] [57] [78] [60] [77] [62] [64] [65][79] [66] [81] [82] [83]
10	Habit	UTAUT	[64] [27] [82]
11	Hedonic Motivation	UTAUT	[57] [77]
12	Price Value	UTAUT	[57] [89] [82]
13	Devices Compatibility	Technical Dimension	[56]
14	Content	Technical Dimension	[76]
15	Technical	Technical Dimension	[92] [89] [88] [86] [93][76] [88] [29]

Table 2. Variable of Theory adoption Technology (cont.)

No	Variable	Domain	References
16	Trust	Additional variable	[78] [71] [75] [63] [87] [86] [84] [59] [88] [77] [62] [81] [83]
17	Actual Use	Additional variable	[84] [85]
18	First Purchase Intention	Additional variable	[87]
19	Internet Adoption	Additional variable	[91] [93] [88]
20	IS Continuance	Additional variable	[90]
21	Preference	Additional variable	[72]
22	Continuance Intention	Additional variable	[27] [27]
23	Satisfaction	Additional variable	[90] [29] [64]
24	IS Quality	Additional variable	[58]
25	Perceived compatibility	Additional variable	[52]
26	Perceived result demonstrability	Additional variable	[52]
27	Perceived relative advantage	Additional variable	[52] [91] [56]
28	Perceived Risk	Additional variable	[56] [86] [89] [77] [75] [61] [62] [91]
29	Perceived visibility	Additional variable	[52]
30	Perceived critical mass	Additional variable	[52]
31	Perceived Credibility	Additional variable	[53]
32	learning opportunity	Additional variable	[72]
33	Situational normality	Additional variable	[84][73]
34	Self-Efficacy	Additional variable	[53]
35	Anxiety	Additional variable	[53]
36	Confirmation	Additional variable	[27] [90]
37	Perceived voluntaries	Additional variable	[27]
38	Information Quality	Additional variable	[29]
39	Structural assurance	Additional variable	[84]
40	Situation Awareness	Additional variable	[86] [57]

Table 2. Variable of Theory adoption Technology (cont.)

No	Variable	Domain	References
41	Lifestyle	Additional variable	[56]
42	Social Factor	Additional variable	[93] [71]
43	Environmental factor	Additional variable	[93]
44	individual factor	Additional variable	[93]
45	Interest in course subject	Additional variable	[76]
46	Instructor support	Additional variable	[76]
47	Community feeling	Additional variable	[76]
48	Reliability	Additional variable	[76]

4. PROMISING TOPICS OF RESEARCH

Based on the classification of e-commerce articles from various leading journals on the topic of intensity and sustainability there is a mapping theory used. Although it does not adopt the theory purely, sometimes variables, and other factors are added, it can be concluded that TAM is the theory most often used in research. The "trust" trend appears with many quotes, this answers the evolution of e-commerce developments in previous research [10] that "trust" trends are present in e-commerce. Some promising research topics from this study include (1) the need to further investigate the relationship between variables in technological adoption theory such as exogenous, endogenous, and mediating variables. Some studies place different acceptance theory variables such as exogenous, endogenous, and intermediate variables. In pure acceptance theory, all key variables are placed as the same variable. Further research is needed to reveal differences in the placement of these variables. (2) the gap between the theory and the existing problem. Changes in variables from the original theory indicate that the variables in the theory are not enough to answer the research problem; (3) addition of variables outside the theory that appear consistently in the solution of research problems. Further research is needed to test the dominance of additional variables that appear in the research problem. This is indicated by the appearance of the same and continuous variables in several papers such as the "Trust" variable; (4) further studies need to be carried out on the variation of variables coming from the same group in many e-commerce papers such as several variables from the domain of technical dimensions; (5) further study is needed to propose a new model with the addition of the Engineering dimension to the existing theory. Technology collaboration and human acceptance began in several recent studies [47][48][49][50][16][70] but with a little literature. Further studies need to be done to get comprehensive results from further studies. Table 3 presents a mapping of future research topics. Along with refinements and criticisms of previous behavioral theories, it is noted that the evolution of the theory took place since the 1970s. Some theories raised in this study and its evolution include TRA in 1967[30], which was refined into the theory of planned behavior (TPB) in 1985 [32], then the technology acceptance model (TAM) in 1989 [31] and finally, the 2003 integrated theory of technology acceptance and use (UTAUT) [33]. The correction of

theory and the discovery of new theories may be carried out as a continuation of this literature study.

5. CONCLUSION

This research has explored trends in e-commerce acceptance theory between 1995 and 2019 from some of the world's leading journals such as Emerald, ScienceDirect, IEEE, and others. The evolution of acceptance theories with changes in various driving factors, due to new problems that are not accommodated in existing theories. This study reveals that there are changes in the factors driving success in e-commerce acceptance. This study uses a literature review approach with data restrictions starting in 1995 with the assumption that e-commerce introduced at that year such as Amazon and eBay [17][18]. The grouping of variables used from various studies shows the trend of changing factors from the original theory of technology acceptance. This study reveals the continued use of the same additional variables in several papers such as the variable "Trust" and others. On the other hand, this study revealed a change in the "trust" factor in the acceptance of e-commerce based on phases.   The initial phase of e-commerce is the introduction to the community with efforts to ensure the existence of e-commerce. "Trust" is an important factor in accepting e-commerce as an alternative to buying and selling after a physical store. Over time and the maturity of e-commerce, the convincing stage of people from e-commerce has finished. "Trust" is an inherent part of the system. Naturally, e-commerce that does not get public trust will not last until now. However, further research needs to be done to uncover the relevance of using the variable "Trust" as an independent variable in e-commerce. "Trust" is embedded in the system and "Trust" is a factor that influences e-commerce transactions [67] [10] open research space to uncover the reliability of trust variables in current e-commerce.   This study proposes additional technical dimension variables in technology acceptance. This is in line with the use of the Technical dimension which continues to be used in various studies. The suitability of the user interface and user experience is one of the reasons for reusing systems and tools for e-commerce in asserting their identity and characteristics. The choice of user experience is very dependent on the segment chosen, about the behavior of the segment and various other psychological approaches. More in-depth research is needed in discussions about User Experience that ultimately determines User Interface [68]. Further research is needed to confirm the possibility of a new model by adding these variables to the existing acceptance theory. This study contributes references to the development of technology acceptance theory in e-commerce. Although there may still be other perspectives that have not been accommodated in this study, it is hoped that the results of this study can add references to the sustainability of e-commerce. Some proposed factors that support the acceptance of e-commerce technology are expected to add insight to the determination of e-commerce strategies in the future.

Table 3. The Mapping of Future Research

No	Future Research	References
1	the need to further investigate the relationship between variables in technological adoption theories such as exogenous, endogenous, and mediating variables; Some studies place different acceptance theory variables such as exogenous, endogenous, and intermediate variables. In the original acceptance theory, all key variables are placed in the same variable. Further research is needed to reveal differences in the placement of these variables.	[54][55][84][85][60] [77] [65][79][66][82]
2	the gap between theory and existing problems. Changes in variables from the original theory indicate that the variables in the theory are not enough to answer the research problem.	[78][71][75][63][87] [86] [84][59][88] [77][62][81][83][53]
3	addition of variables outside the theory that appear consistently in the solution of research problems. Further research is needed to test the dominance of additional variables that arise against the research problem. This is indicated by the emergence of the same and continuous variables in several papers such as the "Trust" variable	[92][89][88] [86][93][76] [29][58][56]
4	Further studies need to be carried out on variations of variables originating from the same group in many e-commerce papers such as several variables from the domain of technical dimensions	[92][89][88][86][93] [76][88][29][58][56]
5	Further studies are needed to propose new models with the addition of the Engineering dimension to existing theories. Technological collaboration and human acceptance began in several recent studies but with little literature.	[47][48][49][50][16]

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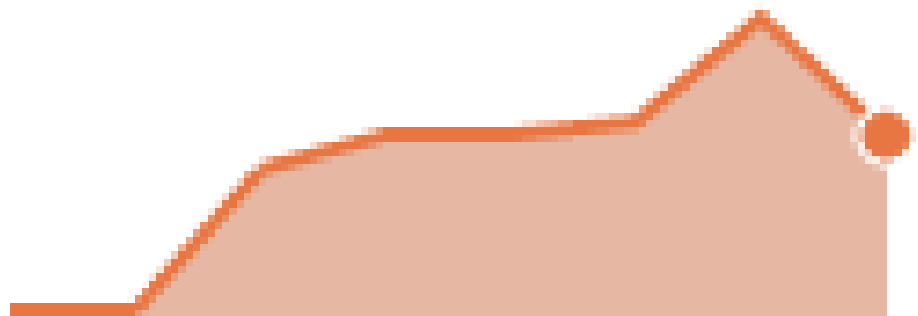
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