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Consumers' Perception of Automatic Emergency Braking (AEB): Theoretical Model and Construct Development

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Abstract – *Due to remarkable developments, various automated driving systems, known as Advanced Driver Assistance Systems (ADAS), have been implemented, and the entire range of human driver activity in modern vehicles is undergoing changes. However, whether or not the consumers will accept and satisfy the emerging technologies, especially Automatic Emergency Braking (AEB), remains a big question. Therefore, it is vital to understand how vehicle consumers or potential consumers decide to use or not to use, and what they expect or perceive of AEB. This work intends to review the published works on AEB to understand the current market of the technology. In order to investigate the user's perception, a developed theoretical model is planned to be adopted. The review was conducted by searching from Google Scholar and the ScienceDirect database through Universiti Malaysia Pahang online databases. The knowledge and understanding of the current AEB market and theoretical model will help researchers plan the next steps to explore consumer or potential consumer perception.*

Keywords: Automatic Emergency Braking (AEB), Consumer Satisfaction Model, Advanced Driver Assistance Systems (ADAS)

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1.0 INTRODUCTION

The idea of autonomous driving is expanded from the current assistance features installed in a vehicle to ease the driving experience. Automated vehicles are referred to the vehicles with the ability to operate at least some mission-critical controls without human intervention. Due to remarkable developments, various automated driving systems, known as Driver Assistance Systems (ADAS), have been implemented, and the entire range of human driver activity in

modern vehicles is changing (Isa et al., 2018). For Malaysia and Indonesia, much remains to be done to ensure ADAS is accepted and gain people's trust in its use. Having good safety features on the vehicle at an affordable price is favorable for Malaysian drivers. The New Car Assessment Program for Southeast Asia (ASEAN NCAP) helps lessen price issues with safety-enhanced vehicles (Abu Kassim et al., 2019). However, to satisfy and ensure positive acceptance of the current technology such as Automatic Emergency Braking (AEB) among drivers is yet another challenge to the car manufacturers. It largely depends on the drivers' perception and experience of the AEB equipped car. Thus, car manufacturers must realize the potential consumer of AEB-equipped vehicles to enhance satisfaction towards AEB and the continuance intention to use AEB-equipped vehicles among the users.

This study intends to: (1) to review the published works about AEB to provide a more in-depth understanding of the technology's current market; and (2) to explore consumer's expectations, experiences, and outcome of technology continuance intention to using a theoretical framework is proposed. This paper also focuses on reviewing the previous studies regarding AEB to gain a further understanding of the autonomous technology in the vehicle. After that, this study intends to propose a theoretical model to investigate the user expectations, experiences, and the outcome of technology continuance intention to use AEB-equipped cars. This study aims at aiding car manufacturers, especially in Malaysia and Indonesia, to recognize consumer satisfaction and their continuance intention to use AEB. Thus, future improvements regarding AEB in vehicles can be implemented to ensure the acceptance and continuance intention to use AEB among consumers.

2.0 METHODOLOGY

Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) is used as guidance for conducting and providing information in this study. For AEB reviewing process, using the term AEB, ADAS with the combination of "OR" and "AND" Boolean operators are used to obtaining the required information. Using the terms of satisfaction model, technology acceptance, consumer confirmation, consumer expectation with the combination of "OR" and "AND" Boolean operator is used to obtain the model and information of the theoretical framework. The review was conducted by searching from Google Scholar, Scopus, Springer, CORE, ResearchGate, Elsevier, ScienceDirect, Semantic Scholar, and the ScienceDirect database through Universiti Malaysia Pahang (http://ezproxy.ump.edu.my/). The knowledge and understanding of the current AEB study and theoretical model will help researchers plan the next steps to exploring consumer or potential consumer perception.

3.0 RESULTS AND DISCUSSION

Using PRISMA, most related articles that are to be included in this study have managed to be gathered. In this section, the review of AEB will first be presented, followed by the finding of the theory or model. Draft of theoretical framework, as well as the constructs and items, will also be provided in this paper.

3.1 Literature Review on AEB

Figure 1 shows the flow of the selection of the articles of AEB and related theory. In the aforementioned methodology section, all of the articles selected from various electronic databases were accessed through a website (http://ezproxy.ump.edu.my/). Based on the PRISMA method, there are four main steps outlined, which are: (1) Identification; (2) Screening; (3) Eligibility; and lastly, (4) Included. A total of 119 articles were selected roughly from the keywords allocated. The keywords were then used to search through the databases. Since the articles were roughly selected, there were many duplicates. After removing the duplicates, the articles remained at 87 (AEB = 78; Theory = 9). During the screening process, only 45 articles were examined for abstract and title. After assessing full-text articles and check for the eligibility of the articles based on inclusion criteria, only 15 articles were considered eligible, focusing on the topic under study. Eventually, only eight articles were retained to be included in this study.

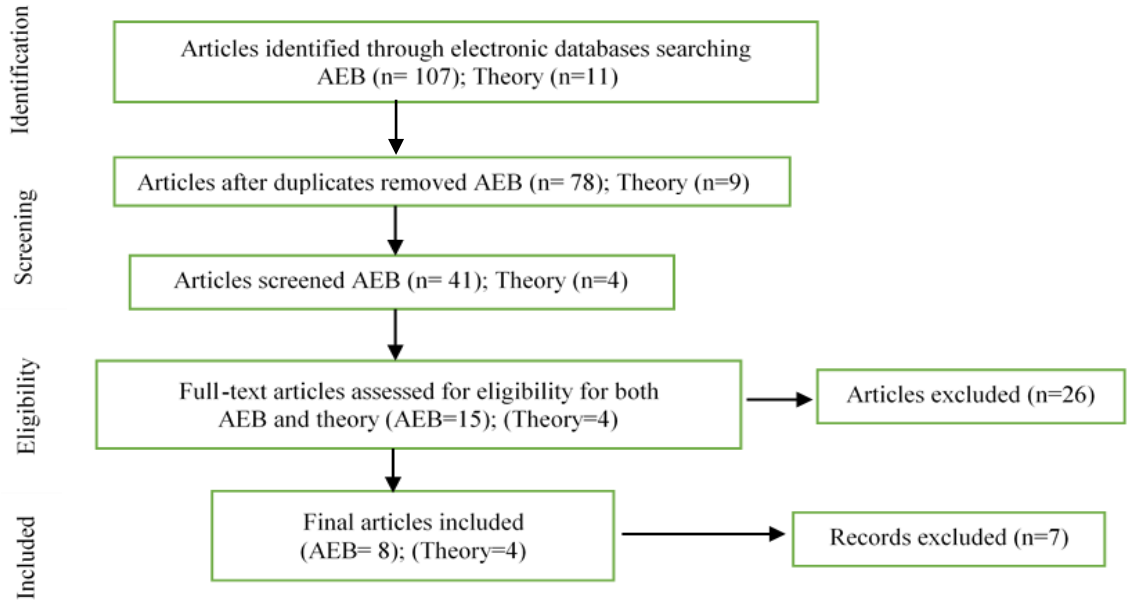


Figure 1: PRISMA result for AEB literature and theory

3.2 Summary of Previous Studies on AEB

Recent cars produced by several prominent local car manufacturers are equipped with AEB. The implementation of new safety features in vehicles is believed to be due to vehicle demands and market strategy. Some highlighted benefits of AEB-equipped vehicles include their ability to automatically detect potentially dangerous scenarios, such as pedestrians (Schachner et al., 2020). Moreover, AEB systems can mitigate collision impact by decreasing the vehicle's velocity in case avoidance is not possible (Haus et al., 2019). Another study stated that the implementation of AEB in vehicles added 70% of accident reduction at the intersection and other safety features implemented, such as driver warning (Sander & Lubbe, 2018). These benefits of AEB in vehicles fit safety design to prevent or reduce the severity of the crashes using various devices, such as cameras, laser, etc., that can predict imminent collision (Mimura et al., 2020).

Based on the literature review, it clearly shows that consumers believe all vehicles should be equipped with AEB. They also believe that with the assistance of AEB, the severity of crashes on the road can be reduced. Consumers are shown to be willing to pay a reasonable price for AEB. Research findings also revealed that consumers are interested in owning vehicles with AEB systems because they are concerned for their safety. However, the performance of AEB concerning the Malaysian road characteristics still needs to be further investigated. Table 1 shows the selected articles that were included in this study. In the table, the finding of each article is also stated.

Table 1: Previous studies regarding AEB

Author (Year)	No. of Respondent	Main Findings
Cicchino (2017)	Secondary data from 22 states in the USA	Front crash prevention systems seem to be effective in preventing rear-end strikes, which are a common crash type. Forward Collision Warning (FCW) with AEB and low-speed AEB appear to be somewhat more effective than FCW alone in reducing these crashes.
Shimazaki et al. (2018)	210 (more than 20 years old)	A majority of respondents (62.4%) believed that all vehicles should be equipped with automatic brakes. The majority of people have an essentially correct understanding, with few people reporting mistaken perceptions, such as automatic braking systems being able to completely prevent collisions.
Bellet et al. (2019)	-	Formulation of the future liability regimes (driving responsibility between the human driver and the vehicle) whenever a collision occurs.
Xia et al. (2013)	-	For Malaysia, AEB system should consider: a) using camera as sensor for distance measuring and avoid using laser range finder due to its excessive cost. b) Multiple object detection algorithms should also be developed to enhance object detectability c) Weather conditions - because they are also the major cause of car accidents.
Razaob et al. (2019)	160	Understanding about pedestrian AEB system among Malaysian people is not high. The majority of them (69%) are willing to pay to install this system on their vehicle up to RM451 to RM550 for pedestrian AEB system.
Baharuddin et al. (2019)	-	For the Association of Southeast Asian Nations (ASEAN) countries, AEB makers need to understand the constraints and limitations of the system. Such as to understand that a certain speed requires certain braking power in order to mitigate or avoid collision without harming both the driver and pedestrians.
Mokhtar et al. (2019)	54	79.6 % of respondents interested in owning vehicles with the AEB system Factors in the study: (1) safety; (2) Performance; (3) Driving Behaviour; (4) Price. Three priority: 1st (safety- reduction of severity of injuries); 2nd (Safety – consequences of system failure; 3rd (Driving behavior- reduction of driver load).
Roslin et al. (2020)	428	Three main factors contribute to the vehicle buying decision: 1. Fuel economy 2. Comfort Technology (Air conditioning – route navigation – window tinting) 3. Safety Assist Technology (Anti-lock Braking System (ABS) – Anti-theft device/ alarms – Emergency Brake Assist (EBA) – Head Protection Technology (HPT) – Stability control system – 6: Auto Emergency Braking (AEB) 4. Purchase price 5. Maintenance

3.3 Theoretical Model

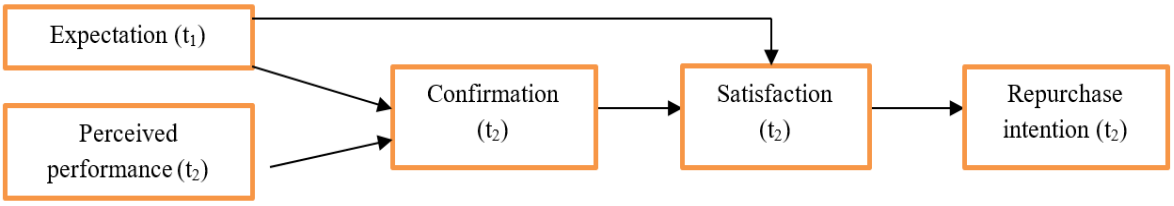
There have been numerous models of socio-psychological aspects of user acceptance towards technological innovation. Based on a theory by Venkatesh et al. (2003), Unified Theory of Acceptance and Use of Technology (UTAUT), a group of researchers had developed Car Technology Acceptance Model (CTAM) (Osswald et al., 2012). They introduced some other attitudinal constructs such as safety and anxiety from the original UTAUT. However, in terms of CTAM's reliability scale, the impact of the proposed factors on behavioral intentions towards the technology failed to be established (Adnan et al., 2018). In a recent car technology and innovation study, Adnan et al. (2018) used UTAUT to explore factors influencing the acceptance of automated vehicles. Adnan et al. (2018) stressed the underlying factors of acceptance, which is, among many others, the trust of the consumers toward the technology. As mentioned in their study, "One of the greatest challenges to building user acceptance is to build trust towards the technology". Based on the deep meaning of one statement, this paper is prepared to look into details how the technology built in a vehicle is perceived by the consumers and investigate their satisfaction and willingness level to use and promote the technology.

Due to the introductory stage of the autonomous vehicle technology, and uncertainty and challenges related to consumer acceptance and satisfaction, researchers have struggled to develop a research model by identifying the key determinants of continuance intention to use (in this study, it is viewed as the feeling of satisfaction of the technology and willingness to promote the technology to others). Consumer retention in any business plays a key role in business success and sustainability. Consumer trust in the technology will determine consumer retention. Acceptance of the introduced technology and trust towards technology are two different socio-psychological aspects. Previous researchers have considered various determinants of technology adoption and acceptance, which may lead to the continuance to use or in their previous research are viewed as repurchase intention (e.g., consumers' perception of the outcome of behavior, the process involved, and trust) (Chou & Hsu, 2016). The researchers use social exchange theory (SET) with the combination of the information system use (continuance) model, whereby the concept of dedication-constraint mechanism for SET is adopted. Dedication mechanism (consumer satisfaction) is referred to as perceived benefit gained from the technology usage, while constraint mechanism (trust and learning) reflects on consumers' investment on the relationship with the retailer, which compels them difficult to switch to a new retailer. Social exchange is defined as the exchange of activity, tangible or intangible, and more or less rewarding or costly, between at least two persons or more. Each relationship partner always seeks to maximize his or her own worth from the relationship, whereby the outcome may lead to engagement, continuation, or termination of the relationship). In other words, SET refers to the extent of any social form of exchange, including tangible/intangible and material/nonmaterial goods exchanged between individuals. The social exchange involves actions that are contingent on rewarding reactions from others (Saavedra & Van Dyne, 1999). The use of SET will explain how such business relationships are maintained or terminated over time (Jeong & Oh, 2017).

In order to help vehicle manufacturers understand consumers' attitudes towards AEB, this study also proposes the use of social exchange theory and its combination with other theories, such as the Expectation-Confirmation Model (ECM), to become a new theoretical framework. ECM has proven to be beneficial in establishing consumers' intention to continue using the adopted technology (Bhattacherjee, 2001). ECM holds the users' satisfaction and perceived usefulness as the predictors of behavior intention, while users' confirmation of expectation and perceived usefulness will lead to users' satisfaction. Bhattacherjee (2001)

integrated the Technology Acceptance Model (TAM) by Davis et al. (1989) into the Expectation Confirmation Theory (ECT) (Oliver, 1980) to develop the ECM. Until present, ECM has been widely used to examine the factors affecting the continued usage intention of an information system technology (Lin et al., 2012; Recker, 2010; Jumaan et al., 2020). ECM has also proved to be robust enough to be integrated with other developed theories, as seen in previous studies (Lin et al., 2012; Recker, 2010).

Expectation-Confirmation Model or ECM (Figure 2) is explored for its inclusion in the theoretical framework of this work. ECM is based on self-perception theory (Bem, 1972) that addresses how individuals continually adjust their perceptions (e.g., expectation) as they acquire new information about the focal behavior (by observing their own behaviors and others). ECM is an adaptation of Expectation-Confirmation Theory (ECT) which holds that expectations and perceived performance lead to post-purchase satisfaction and thus, influence repurchase intention (Hsu & Lin, 2015). Therefore, a user may keep updating expectations towards using the technology as one gains more experiences from its use. ECM proposes to predict and explain the continued use of the technology by positing that perceived usefulness and confirmation are two primary determinants of technology continuance intention. Whenever the performance of the technology is confirmed to have met the users' expectations, satisfaction towards the application will be achieved; this will lead to the technology continuance intention. ECM has received considerable attention from researchers in terms of post-acceptance behavior towards technology usage, especially in the information technology discipline. This study intends to expand the usage of ECM in the context of automotive technology.



Note: t_1 = pre-consumption variable; t_2 = post-consumption variable

Figure 2: ECM model (Bhattacherjee, 2011)

Thus, by using the aforementioned theory and model (Social Exchange Theory) and Expectation-Confirmation Model, a draft of the theoretical framework is developed. Previous studies have shown that vehicles with the AEB provide benefits to car drivers (consumers) in terms of safety. With the expectation of consumers' belief, which is the AEB performance is tailored with the manufacturers' claims and being confirmed by the consumer experience in driving the vehicle with the AEB system, satisfaction is predicted to be obtained. Thus, it will lead to the technology continuance intention. This paper is referred to the liking of using vehicles with AEB and the possibility to promote the technology to others. Bhattacherjee (2001) mentioned further extension of the ECM would have a better understanding of the continued technology usage behavior. Therefore, this study proposes the inclusion of perceived values, which consist of five constructs; they are perceived performance, perceived usefulness, perceived ease of use, value for money, and complacent behavior.

Figure 3 demonstrates the proposed theoretical framework for exploring consumer satisfaction and continuance of use of AEB and the continuance intention to use the technology, which this study aims to conduct for Malaysian and Indonesian drivers. Based on Figure 3, ten constructs are proposed. The constructs are consumer trust, consumer expectation, confirmation, satisfaction, perceived value, which consist of perceived performance, perceived usefulness, perceived ease of use, value for money, complacent behavior, and lastly, the continuance intention to use. Each construct is proposed and linked to the other, as suggested in the previous study. This work also proposed research hypotheses, as shown in the next paragraph.

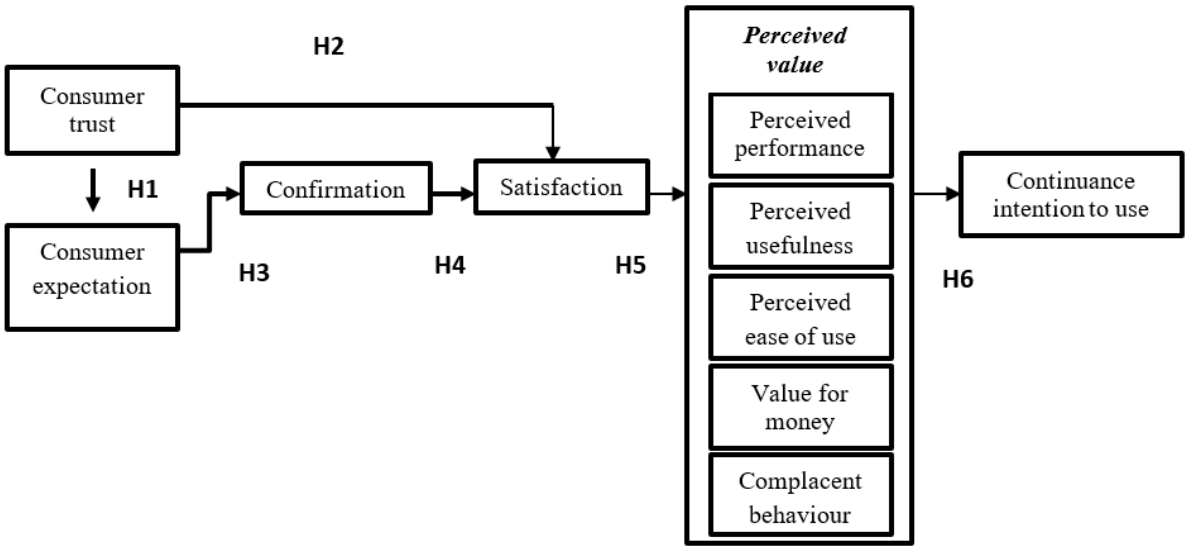


Figure 3: Proposed theoretical framework of the study

There are six (6) hypotheses proposed for this study:

i. **Hypothesis 1** (H1): Consumer trust will positively affect expectation.
ii. **Hypothesis 2** (H2): Consumer trust will positively affect satisfaction.
iii. **Hypothesis 3** (H3): Consumer expectation will positively affect confirmation.
iv. **Hypothesis 4** (H4): Confirmation will positively affect satisfaction.
v. **Hypothesis 5** (H5): Satisfaction will positively affect perceived value: (a) Perceived performance; (b) Perceived usefulness; (c) Perceived ease of use; (d) Value for money; and (e) Complacent behavior.
vi. **Hypothesis 6** (H6): Perceived value will positively affect the continuance intention to use.

3.3.1 Preliminary Construct and Item Proposal

There are ten constructs with 84 items proposed in this study, which are consumer trust, consumer expectation, confirmation, satisfaction, perceived performance, perceived usefulness, perceived ease of use, value for money, complacent behavior, and continuance intention to use. The items are yet to be validated by expert panels. The items will be validated for content validity and further with construct validity before they are administered to the target respondents.

3.3.2 Construct 1: Consumer Trust

Trust is an interpersonal determinant of behavior that deals with beliefs about the integrity, ability, and predictability of other people (McKnight et al, 2002). This construct consists of 12 items which are coded as CT1 till CT12. This construct will measure the trust of the AEB-equipped vehicle user. Table 1 shows the items in the Construct 1.

Table 1: Construct of consumer trust

Items		Sources
CT1	This AEB vendor (car manufacturer) gives the impression that it keeps promises and stay to commitments.	Kim (2012)
CT2	I believe that cars equipped with AEB are designed with my best interest in mind.	
CT3	I feel that I can trust cars equipped with AEB.	Alshibly et al. (2015); Kim (2012); Leninkumar (2017); Gupta et al. (2015)
CT4	Cars equipped with AEB are functioning very well to prevent any crashes from happening.	Alshibly et al. (2015)
CT5	Cars equipped with AEB make me feel safe and confident to drive.	Alshibly et al. (2015); Leninkumar (2017) Jahanshahi et al. (2020) Gupta et al. (2015)
CT6	In my opinion, AEB cannot be trusted at times.	Danesh et al. (2012)
CT7	In my opinion, cars equipped with AEB can be trusted to do what is right.	Danesh et al. (2012)
CT8	In my opinion, cars equipped with AEB effectively prevent crashes or mitigate impacts.	Danesh et al. (2012); Alshibly et al. (2015)
CT9	When the car dealer suggests that I buy a car equipped with AEB, it is because it is the best for my situation.	Leninkumar (2017)
CT10	I will not run the risk of financial losses by installing AEB in my cars.	Gupta et al. (2015)
CT11	AEB functionality is reliable.	Gupta et al. (2015); Rahi et al. (2019b)
CT12	AEB-equipped car seems dependable	Gupta et al. (2015)

3.3.3 Construct 2: Consumer Expectation

Consumer expectation is defined as the degree to which consumers believe they should and will receive from AEB usage while driving (Kim, 2012). This construct is to measure the expectation of the AEB-equipped vehicle consumer before the purchasing process occurs. There are six items in this construct, ranging from CE1 until CE6. Table 2 shows the construct of consumer expectation.

3.3.4 Construct 3: Confirmation

The next construct is confirmation. Confirmation construct is defined as the extent to which consumers perceive their initial expectation of technology (AEB) as being confirmed during actual use (Bhattacherjee, 2011). This construct consists of seven items ranging from C1 to C7. This construct measures the confirmation of expectation before the pre-purchase stage. Table 3 shows the items in the confirmation construct.

Table 2: Consumer expectation construct

Items		Sources
CE1	Do you have high expectations in general regarding the functionality of AEB usage when driving?	Kim (2012)
CE2	How well will the AEB functionality prevent you from collision and impact mitigations?	
CE3	I expect things could go wrong (e.g., AEB error) when using the system while driving.	
CE4	The AEB functionality when driving fits my expectation.	Baharum et al. (2018)
CE5	AEB effectiveness in preventing impending forward crashes fits my expectation.	
CE6	My experience in using AEB when driving is better than I expected.	

Table 3: Confirmation construct

Items		Sources
C1	My experience using an AEB-equipped car was better than what I expected.	Hsu and Lin (2015); Park (2020); Kim (2012) and Bhattacherjee (2011)
C2	The functionality provided by AEB when driving is better than what I expected.	
C3	Overall, most of my expectations about AEB are confirmed.	
C4	The efficiency of AEB is better than what I expected.	Jin et al. (2013) and Bhattacherjee (2011)
C5	Overall, the functionality of the AEB-equipped car is much worse than expected.	Dai et al. (2020)
C6	The AEB-equipped car meets my needs.	Baharum et al. (2018)
C7	The AEB-equipped car fits my needs.	

3.3.5 Construct 4: Satisfaction

Construct 4 is satisfaction and defined as a positive affective state resulting from a general performance based on prior experience using AEB-equipped cars (Bhattacherjee, 2011). After the consumer experience the AEB-equipped car, the satisfaction of the usage will be measured using this construct. There are eight items under the satisfaction construct, ranging from S1 to S8. Table 4 shows the items in the satisfaction construct.

3.3.6 Construct 5: Perceived Performance

Perceived performance is defined as the degree to which an AEB is perceived as having functional value based on perceived quality and performance expectations Sweeney and Soutar (2001). There are 13 items in the construct. This construct is used to measure the performance of the AEB-equipped car after the user has had experience in using the car. Table 5 shows the items included in the perceived performance construct.

3.3.7 Construct 6: Perceived Usefulness

Perceived usefulness is defined as the degree to which a person believes that using a particular system would enhance his or her job performance (Davis et al., 1992). Construct 6 is used to measure the usefulness of AEB in vehicles after the consumer has experienced the use of the vehicle. There are five items to measure the perceived usefulness, which are coded from PU1 to PU5. Table 6 shows the items in the perceived usefulness construct.

Table 4: Items in the satisfaction construct

	Items	Sources
S1	The expectations that I have regarding AEB are correct.	Kim (2012); Park (2020)
S2	Do you have a good feeling about your overall experience of the use of AEB?	Kim (2012)
S3	Overall, I am satisfied with AEB.	Park (2020)
S4	I am very pleased with my experience driving the AEB-equipped car.	Park (2020); Hsu and Lin (2015)
S5	Driving the AEB-equipped car makes me feel very satisfied.	Hsu and Lin (2015)
S6	Driving the AEB-equipped car gives me a sense of enjoyment.	Park (2020); Hsu and Lin (2015)
S7	Using systems makes me feel very content.	Hsu and Lin (2015)
S8	Interacting with AEB operation is fun.	Park (2020)

Table 5: Perceived performance

	Items	Sources
PP1	I find AEB useful in reducing road accidents.	Jahanshahi et al.(2020); Berry (2018)
PP2	AEB helps me reach my destination more quickly.	Jahanshahi et al. (2020); Madigan et al. (2016); Berry (2018)
PP3	AEB increases my driving performance.	Ahmed and Mansoori (2017); Berry (2018); Kim (2012)
PP4	AEB enables me to drive more conveniently and effectively.	Sair and Danish (2018); Kwok (2015); Kim (2012)
PP5	I think the implementation of AEB will become an important part of existing car components.	Madigan et al. (2016)
PP6	I am convinced that using AEB will add value to my driving.	Onaolapo and Oyewole (2018)
PP7	In general, I find AEB useful to me.	Sair and Danish (2018); Kwok (2015); Berry (2018)
PP8	AEB does not improve my driving performance.	Onaolapo and Oyewole (2018)
PP9	There is no advantage associated with the use of AEB in driving.	
PP10	AEBs in cars are well designed.	Hsu and Lin (2015)
PP11	AEB has an acceptable standard of quality.	
PP12	AEB offers effective functions.	
PP13	The system of AEB operation is stable.	

Table 6: Perceived usefulness

	Items	Sources
PU1	Using AEB enables me to improve my safe driving skills.	Kim (2012)
PU2	Using AEB enhances my effectiveness in driving (e.g., I can reduce the severity of accident injuries).	
PU3	Overall, an AEB- equipped car is useful while driving.	Kim (2012); Baharum et al. (2018); Park (2020)
PU4	Using AEB increases my driving productivity (i.e., I can make my car stop before it crashes into objects).	
PU5	Driving an AEB- equipped car would help me detect any impending forward crashes in time.	Dai et al. (2020)

3.3.8 Construct 7: Perceived Ease of Use

Construct 7, which is perceived ease of use, is defined as the degree to which a person believes that using a particular system would be free from effort, or in other words, the level of ease of use of these technologies (Davis, 1989). There are six items in this construct. Each item is coded from EU1 to EU6. Table 7 displays the items included in the perceived ease of use construct.

Table 7: Perceived ease of use

	Items	Sources
EU1	My interaction with AEB operation is clear and understandable	Park (2020); Jahanshahi et al. (2020); Adell (2009)
EU2	Interacting with AEB does not require mental effort	Park (2020)
EU3	I find the AEB easy to use	Jahanshahi et al. (2020); Madigan et al. (2016); Adell (2009); Park (2020)
EU4	Learning to use an AEB is easy for me	Jahanshahi et al. (2020); Madigan et al. (2016); Adell (2009)
EU5	Using AEB while driving is not frustrating.	Onaolapo and Oyewole (2018)
EU6	It is easy for me to become skillful at using AEB	Venkatesh et al. (2015); Berry (2018); Palau-Saumell et al. (2019)

3.3.9 Construct 8: Value for Money

Construct 8 is the value for money. It is defined as the degree to which consumers perceive the cost (be it monetary or otherwise) of using the system as reasonable (Sweeney & Soutar, 2001; Hsu & Lin, 2015). There are seven items, i.e. VM1 to VM7. This construct will measure the economic value of the AEB-equipped vehicle from the user perception of usage. Table 8 shows the items in the value for money construct.

Table 8: Value for money

	Items	Sources
VM1	Vehicles with AEBs are reasonably priced.	Hsu and Lin (2015)
VM2	AEB-equipped vehicle offer value for money in terms of accident prevention.	
VM3	AEB-equipped vehicles are economical.	
VM4	The functionality of AEB-equipped vehicle is good in relation to the price.	
VM5	There are financial barriers to use AEBs in cars.	Park (2020)
VM6	I think AEB-equipped vehicles are expensive.	
VM7	Overall, using AEB-equipped vehicle costs me a lot of money.	

3.3.10 Construct 9: Complacent Behaviour

Construct 9 is defined as the degree to which a person's attention is devoted to monitoring automated tasks (specifically, the lack thereof) (Merritt et al., 2019). Complacent behavior can be considered as being pleased with certain advantages or situations to the point of unawareness of the potential incoming danger or defect. This construct consists of nine items, ranging from CC1 to CC9. Table 9 shows the items in the complacent behavior construct.

Table 9: Complacent behaviour (Merritt et al. 2019)

	Items
CC1	When I have many things to do, it makes sense to let AEB stop the car to prevent
CC2	If I drive aggressively, I would let AEB to prevent collisions for me.
CC3	AEB should be used to ease people's driving performance.
CC4	If AEB is available to help me in preventing collisions, it makes sense for me to pay more attention to my other tasks while driving.
CC5	Even if AEB can help with a crash prevention system, I should pay attention to its operation.
CC6	Distractions while driving are less of a problem for me as I have an AEB to reduce the impact of a collision.
CC7	Constantly monitoring an AEB system performance is a waste of time.
CC8	Although I am focused on driving, I would monitor the AEB system carefully to avoid any errors.
CC9	It is usually unnecessary to pay much attention while driving when AEB is operating.

3.3.11 Construct 10: Continuance Intention to Use

Lastly, construct 10, which is continuance intention to use. This construct is defined as the degree to which, following an initial acceptance decision, the users would like to keep using the car with AEB (either to use despite their dislike of the feature or to recommend an AEB-equipped car to a friend) (Bhattacherjee, 2011). After the consumer experiencing the AEB-equipped vehicle, this construct will measure whether the consumer will continue to use the AEB function, otherwise, they will have to still use it even if they do not like the function. There are 11 items in this construct coded from IU1 to IU11. Table 10 shows the items included in Construct 10.

Table 10: Continuance intention to use

	Items	Sources
IU1	I am likely to continue using AEB while driving.	Park (2020); Jahanshahi et al. (2020); Rahi and Abd. Ghani (2019a);
IU2	I intend to use AEB consistently.	Park (2020); Rahi and Abd. Ghani (2019a)
IU3	If I were to buy a car again, I would likely buy an AEB-equipped car.	Park (2020); Kim (2012)
IU4	If I were to buy a car again, I would buy an AEB-equipped car.	Kim (2012)
IU5	I would recommend an AEB-equipped car to a friend.	Baharum et al. (2018)
IU6	I would recommend an AEB-equipped car to a friend.	Baharum et al. (2018); Hsu and Lin (2015)
IU7	I like driving AEB- equipped cars.	Baharum et al. (2018)
IU8	My intention is to continue using an AEB-equipped car instead of a non-AEB-equipped car.	Jin et al. (2013); Bhattacherjee (2011); Gupta et al. (2015)
IU9	I will continue using an AEB-equipped car although I dislike it.	Jin et al. (2013) Bhattacherjee (2011)
IU10	I will always use AEB while driving in my daily life.	Jahanshahi et al. (2020); Rahi and Abd. Ghani (2019a)

4.0 CONCLUSION

In conclusion, this paper has successfully reviewed the published articles on AEB-equipped vehicles. An autonomous system in vehicles is one of the emerging technologies that can prevent imminent accidents and reduced the severity of a collision. Hence, this study was conducted to specifically recognize the satisfaction and continuance intention to use AEB-equipped vehicles. Several databases were used to gather the articles that are related to the

AEB-equipped vehicles using the keywords and terms. Next, this paper proposed a theoretical framework that was adapted from Social Exchange Theory (SET) and Expectation-Confirmation Model (ECM). The proposed model and the development of the framework were discussed in Section 3.3 of the theoretical model. Then, this paper proposed ten constructs of dimensions, which are outlined in the preliminary construct and item proposal. The total number of items proposed in this study is 84 items. Each construct will be used to measure the satisfaction and continuance intention to use an AEB-equipped vehicle among the users. Apart from that, the items were developed and achieved from several published papers, specifically regarding the topic under study. Further steps to ensure the validity of the construct were also conducted. The items that will be used are yet to be validated by the expert panels. The appointed expert panels will measure the construct of the items in terms of content validity, where experts in psychology will be appointed to review the translated items. A pilot study will be run to test the reliability of the instruments. Two professional translators will be appointed to translate all items into the Malay and Indonesian languages. After the translation, two researchers took part in the back-translation sessions to validate the translation results. For data collection, the inclusion criterion was at least three months of experience using the AEB. Respondents will be instructed to reply to each questionnaire item using a 7-point Likert scale from 1 (strongly disagree) to 7 (strongly agree).

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