Effect of autonomous vehicle-related eWOM on (fe)males' attitude and perceived risk as passengers and pedestrians

Abstract:

Purpose: This study investigates how autonomous vehicle (AV)-related electronic word-of-mouth (eWOM) of different polarities affect attitude and perceived risk from the perspectives of both passengers and pedestrians, and whether any gender differences exist. It also seeks to identify AV-adoption user archetypes.

Design/methodology/approach: An online experiment was conducted, manipulating eWOM polarity (positive, negative, or mixed) as a between-participants factor.

Findings: While eWOM polarity did not affect attitude, perceived risk was the highest in the mixed eWOM condition. Males and females differed from each other in terms of attitude toward AVs from a passenger perspective, attitude toward AVs from a pedestrian perspective, and perceived risk for passengers in AVs. Four AV-adoption user archetypes were identified: AV watchfuls, AV optimists, AV nonchalants, and AV skeptics.

Originality: The paper contributes to the AV adoption literature by adding the effects of eWOM. It not only sheds light on how AV-related eWOM polarity affects attitude and perceived risk but also teases out nuances from the perspectives of passengers and pedestrians as a function of gender.

Keywords: artificial intelligence; AI attitude; autonomous vehicles; electronic word-of-mouth; eWOM polarity; eWOM valence; perceived risk; public perceptions; self-driving cars; social media; user-generated content.

Article classification: Research paper

Introduction

Autonomous vehicles (AVs) constitute a key disruptor in the next technology revolution in transportation. Equipped with self-driving capabilities through a myriad of cameras, distance-measuring lasers and sensors, AVs rely on artificial intelligence—either partially or fully—to decide where to steer and when to brake. Anticipated to be a usual apparatus by 2050, tech-giants such as Google and automakers such as Tesla have been making huge investments to develop AVs (Cho and Jung, 2018). The advantages of AVs include greater road safety (Rhim et al., 2020), a more inclusive mobility option to the disabled and the elderly (Tan et al., 2022) as well as reduced energy consumption (Cho and Jung, 2018).

Beyond the hype and promises, however, there are lingering concerns. For example, as with any computerized systems, AVs are susceptible to data protection and cyber-security breaches. A quick transition to AVs would result in massive driving-related job losses. Moreover, the embedded ethics of AVs in making decisions in the event of a traffic emergency with life and death consequences can be unsettling (Frank et al., 2023; Rhim et al., 2020). Unsurprisingly, the sentiment around AVs continues to lag market expectation, resulting in a gap between technological possibilities and consumer acceptance (Tan et al., 2022). This can eventually dampen commercialization efforts and even frustrate governments' rollout plans.

Meanwhile, the discussion on AVs has found its way into social media (Jing et al., 2023). For example, in March 2018, an Uber-pedestrian accident and a Tesla's Model X crash sent online users into a frenzy, with the safety of autonomous driving technology being flagged as a major concern (Penmetsa et al., 2021). Moreover, what individuals read online could affect their attitudes and perceptions, as explained by

cultivation theory (Gerbner and Gross, 1976; Liu, 2021; Stein et al., 2021; Wei et al., 2020) and social influence theory (Hung et al., 2023; Kelman, 2006). In general, user-generated electronic word-of-mouth (eWOM), often assumed to be unbiased, is considered more reliable than one-sided messaging from marketers (Kitirattarkarn et al., 2021; Sharma and Mishra, 2022).

Hence, drawing on cultivation theory and social influence theory, this study argues that AV-related eWOM—either positive or negative—can serve as a cultivation nexus to influence AV-related attitudes and perceptions that in turn can have a bearing on AV adoption. A recent meta-analysis has identified attitude as a key facilitator of AV adoption whereas perceived risk is found to be a major deterrent (Gopinath and Narayanamurthy, 2022). Attitude refers to the degree of favorability toward AVs (Ajzen, 1991; Böhm et al., 2017) while perceived risk refers to the subjective assessment of the associated negative consequences (Gopinath and Narayanamurthy, 2022; Hulse et al., 2018). Clearly, for AVs to gain traction among the public, it is important for eWOM to foster a favorable attitude and attenuate any risk perceptions.

In this vein, two conundrums can be identified in the literature. The first pertains to the role of eWOM polarity. Some studies suggest negative eWOM to be more impactful for decision-making than positive ones (Bachleda and Berrada-Fathi, 2016; López-López and Parra, 2016). Others argue that a mix of both positive and negative eWOM could have a stronger sway because it paints a fairer picture (Cheung and Thadani, 2012; Prendergast et al., 2016). The inconclusive findings call for further research on how AV-related eWOM of different polarities affects attitude and perceived risk.

The second conundrum pertains to the role of gender. Some studies suggest that males are more technophilic and hence are more likely to engage with eWOM than females (Lin et al., 2017; Mishra et al., 2018; Sharma and Mishra, 2022). Others contend that females process information more methodically and hence are more likely to be influenced by eWOM (Prendergast et al., 2016; Kol and Levy, 2023; Zhang et al., 2014). Hence, how AV-related eWOM influences males and females differently is worth studying.

Besides, a major limitation in the AV adoption literature is that although AVs could be viewed differently depending on the types of road user (Hulse et al., 2018; Rahman et al., 2019), such nuances are seldom teased out. To a passenger, AVs offer all the benefits of convenient commuting. With improved vehicular coordination at crosswalks and intersections, a pedestrian who has the right of way can enjoy safe crossing. However, the passenger must contend with potential problems including system malfunctions and in drastic cases, collisions. The pedestrian could be deprived of any human interaction such as making eye contact or using hand gestures during ambiguous situations (Rothenbücher et al., 2016).

For these reasons, this study investigates how AV-related eWOM of different polarities affect attitude and perceived risk from the perspectives of both passengers and pedestrians, and whether any gender differences exist. Furthermore, as AV-related eWOM can give rise to homogeneous subgroups of individuals with similar attitudes and perceptions (Baumann et al., 2023; Li, 2020; Petrescu et al., 2023), the study also seeks to explore whether specific AV-adoption user archetypes could be identified.

The paper is significant for both theory and practice. On the theoretical front, it contributes to the AV adoption literature (e.g., Hulse et al., 2018; Kyriakidis et al.,

2015) by adding the effects of eWOM. This is informed by cultivation theory (Gerbner and Gross, 1976; Liu, 2021; Stein et al., 2021; Wei et al., 2020) and social influence theory (Hung et al., 2023; Kelman, 2006). The study not only sheds light on how AV-related eWOM polarity affects attitude and perceived risk but also teases out nuances from the perspectives of passengers and pedestrians as a function of gender. On the practical front, the AV-adoption user archetypes developed in the paper could be used to segment prospective AV users. This would ultimately help policymakers and automakers develop targeted strategies for rollout and marketing purposes.

Literature Review

Three strands of research could be identified in the AV adoption literature. The first focuses on understanding factors that predict individuals' AV uptake. Some studies are exploratory in nature and interrogate individuals' willingness to use AVs as a function of demographic variables such as age and gender (e.g., Hulse et al., 2018; Schoettle and Sivak, 2014). Others apply qualitative methods to develop an in-depth understanding of attitudes and perceptions (e.g., Nordhoff et al., 2019; Pettigrew et al., 2019). Confirmatory studies, in contrast, seek to test variables from the theory of planned behavior (e.g., Rahman et al., 2019), technology acceptance model (e.g., Man et al., 2020), and/or the unified theory of acceptance and use of technology (e.g., Bernhard et al., 2020). Only a handful have focused on the road user perspectives of passengers and pedestrians granularly (e.g., Rahman et al., 2019). However, the role of eWOM in affecting AV adoption has rarely been explored.

Second, the large body of research on AV uptake has created a fertile ground for several consolidatory studies involving literature reviews. One of them found AV adoption to be fueled by three groups of factors (Golbabaei et al., 2020). The first

includes demographics such as income and gender, the second comprises psychological factors such as AV awareness and perceived usefulness, and the third consists of mobility behavior factors such as crash history and vehicle ownership. More recently, another review article examined the relative strengths of the AV adoption predictors (Gopinath and Narayanamurthy, 2022). Among all the determinants, attitude was the strongest predictor of AV adoption while perceived risk emerged as the only deterrent.

Finally, an emerging strand of research examines online chatter on AVs. The assumption is that AV-related eWOM is a proxy for sentiment on the ground. An analysis of tweets in the wake of accidents involving AVs has revealed widespread pessimism among the public (Penmetsa et al., 2021). Major themes discussed online were found to revolve around knowledge of AVs, their predictability, severity of adverse consequences, attitude, and perceived risk (Jing et al., 2023).

Other than thematic analysis, however, extant works remain silent over the effects of AV-related eWOM even though there is growing evidence that eWOM about new or upcoming products can offer valuable insights for key stakeholders. For example, Banerjee et al. (2021) showed that eWOM about anticipated Apple and Samsung products before their launch could be a useful resource for the businesses' marketing and project management teams. Hernández-Fernández et al. (2019) linked eWOM on the product Google Glass to its failure. Hence, eWOM on AVs is poised to offer crucial insights into their public acceptance, an understanding of which is vital for businesses and governments.

Development of the Research Model

Effect of eWOM polarity on attitude and perceived risk

This study argues that AV-related eWOM can serve as a cultivation nexus to influence AV-related attitude and perceived risk. This is informed by the related perspectives of cultivation theory and social influence theory. According to cultivation theory, information that individuals receive from media shape their worldviews (Gerbner and Gross, 1976). Though originally proposed to explain the effect of traditional media, cultivation theory has consistently been shown to be relevant in the online realm (Liu, 2021; Stein et al., 2021; Wei et al., 2020). In fact, on social media, cultivation effects can take place quicker even after a single, brief exposure (Stein et al., 2021). Social influence theory posits that individuals' attitudes, perceptions and even actions are influenced by their social interactions with others (Kelman, 2006). Over the years, research has highlighted eWOM as a major tool for exerting social influence through the online channel (Hung et al., 2023; Zhao et al., 2018). With the growth of AV-related eWOM on social media (Jing et al., 2023; Penmetsa et al., 2021), understanding its influence on attitude and perceived risk is important.

Polarity, also interchangeably referred to as valence, is one of the most studied attributes of eWOM (Duan et al., 2008; Kitirattarkarn et al., 2021; López-López and Parra, 2016). While some studies conceptualize polarity as either positive or negative (Kitirattarkarn et al., 2021), the reality is that eWOM also carries sentiments from both ends of the spectrum, known also as mixed polarity (Banerjee and Chua, 2017; Hwang et al., 2018). Meanwhile, recent AV adoption studies highlight an increasingly greater reliance on eWOM (Sharma and Mishra, 2022), where a diverse range of comments with different polarities is likely to be presented (Penmetsa et al., 2021). Therefore, this study examines the effects of positive, negative as well as mixed AV-related eWOM on attitude and perceived risk.

Between the two extremes, negative eWOM tends to exert a greater impact. This is attributed to the notion of negativity bias, which suggests that bad is usually more memorable and diagnostic than good. Negative eWOM spreads faster and is deemed as being more credible and helpful than positive eWOM (Bachleda and Berrada-Fathi, 2016; López-López and Parra, 2016). This body of literature suggests that attitude would be significantly lower and perceived risk higher in the negative eWOM condition than in the positive eWOM condition, regardless of the types of road user.

However, when positive, negative, and mixed polarities are considered in tandem, there are two competing possibilities. On the one hand, negativity bias could still make its presence felt. If so, attitude would be significantly lower and perceived risk higher in the negative eWOM condition than in the positive or the mixed eWOM conditions.

On the other hand, mixed eWOM could have a stronger sway. By highlighting both sides of the story, mixed eWOM could dictate attitude and perceived risk more strongly vis-à-vis either positive or negative eWOM (Cheung and Thadani, 2012; Prendergast et al., 2016). This is undergirded by prospect theory, which suggests that individuals make decisions based on both potential losses and gains but giving more emphasis to the former (Kahneman and Tversky, 1979). Conceivably, mixed eWOM enables prospective AV passengers and pedestrians to deliberate on potential losses and gains carefully. However, such an assessment is not possible when one comes across eWOM that is entirely positive or negative (Prendergast et al., 2016). Despite the equivocality in the literature on eWOM polarity in general, the effect of AV-related eWOM cannot be ignored. Thus, the following hypothesis is posited:

H1: AV-related eWOM polarity affects attitude and perceived risk for passengers and pedestrians.

Gender differences in attitude and perceived risk

Gender remains one of the most common forms of market segmentation. Two gender-based theoretical lenses could be brought to bear. One is rooted in social role theory, which posits that behavioral differences emerge between men and women through socialization and gender role formation (Eagly, 1987). As children develop into adults, they imbibe existing gender stereotypes that shape their attitudes and perceptions (Eagly, 1987; Eagly and Wood, 1991; Mishra et al., 2018; Putrevu, 2001). Females tend to be communal while males are more agentic. In consequence, males generally find technology-oriented factors more appealing (Eagly, 1987; Eagly and Wood, 1991; Lin et al., 2017). In line with social role theory, males are more likely to engage with eWOM (Lin et al., 2017; Mishra et al., 2018). They are more likely to have a favorable attitude toward technology (Hőgye-Nagy et al., 2023). Moreover, males have greater risk-taking propensity, which positively moderates the relationship between eWOM and decision-making (Sohaib et al., 2018). When applied to this study, the social role argument suggests that eWOM polarity would have a greater impact on males than females in influencing attitude and perceived risk.

Selectivity hypothesis, on the other hand, posits that males tend to be selective information processors who rely on heuristics while females tend to process all available information methodically (Meyers-Levy, 1988; Putrevu, 2001). Males are known to be particularly susceptible to the use of cognitive shortcuts when processing eWOM (Liu et al., 2017). Hence, females are likely to pay closer attention to eWOM, elaborate on the message claims more extensively, and allow their attitudes and risk

perceptions to be swayed by eWOM (Prendergast et al., 2016; Kol and Levy, 2023; Liu et al., 2017; Zhang et al., 2014). This is probably why some studies have found the effect of eWOM on purchase intention to be stronger among females (Bae and Lee, 2010). If the selectivity hypothesis holds good in the context of AV-adoption, eWOM polarity could have a greater impact on females than males in influencing attitude and perceived risk. Given the tension in the literature on the role of gender in the context of eWOM, the following hypothesis is posited:

H2: The effect of eWOM polarity on attitude and perceived risk differs between males and females.

Attitude and perceived risk as user archetypes

The success of AV adoption hinges in part on an understanding of market segmentation. To this end, the classic diffusion of innovations theory has identified five user archetypes: innovators, early adopters, early majority, late majority, and laggards (Rogers, 2003). Innovators are known for their intrepidity, fearlessly taking risk to try new technologies. Early adopters share similar traits but exhibit some level of caution. The early majority are even more cautious and are more price sensitive than both innovators and early adopters. The late majority and the laggards are extremely conservative and are reluctant to invest in new technologies. From innovators to laggards, age increases while socioeconomic status decreases (Li, 2020; Rogers, 2003).

While these user archetypes offer a useful market segmentation strategy, they are not particularly helpful for AVs. For one, they are too generic and ignore contextual idiosyncrasies such as the types of road user—passenger or pedestrian (Li, 2020; Robey et al., 2008). Second, they are largely dictated by demographics and

personality but overlook the possibility for attitudes and perceptions to be molded by what individuals read online.

Expectedly, recent studies have called for the clustering of new technology adopters to go beyond demographics and personality traits (Baumann et al., 2023; Li, 2020; Petrescu et al., 2023). Thus, for the purpose of this study, attitude and perceived risk are jointly used as the basis to derive AV-adoption user archetypes. After all, a recent meta-analysis (Gopinath and Narayanamurthy, 2022), which examined the relative strengths of the AV adoption predictors in prior studies, identified attitude as the strongest determinant whereas perceived risk emerged as the only negative predictor of AV adoption. AV-adoption user archetypes that are based on attitude and perceived risk, hence, could inform implementation strategies.

Individuals' attitude and perceived risk toward AVs could vary greatly, ranging from sky-high optimism to utter pessimism (Pettigrew et al., 2019). Moreover, such attitudes and risk perceptions do not merely exist in a vacuum but are likely to be shaped by eWOM (Liu, 2021; Stein et al., 2021). This study is thus motivated in part by the lack of research undertaken to explore the extent to which AV-related eWOM can give rise to AV-adoption user archetypes. For this purpose, the following exploratory research question is investigated: What user archetypes based on AV-related attitude and perceived risk are engendered by eWOM of various polarities?

The overall research model, encompassing the two hypotheses and the exploratory research question, is depicted in Figure 1.

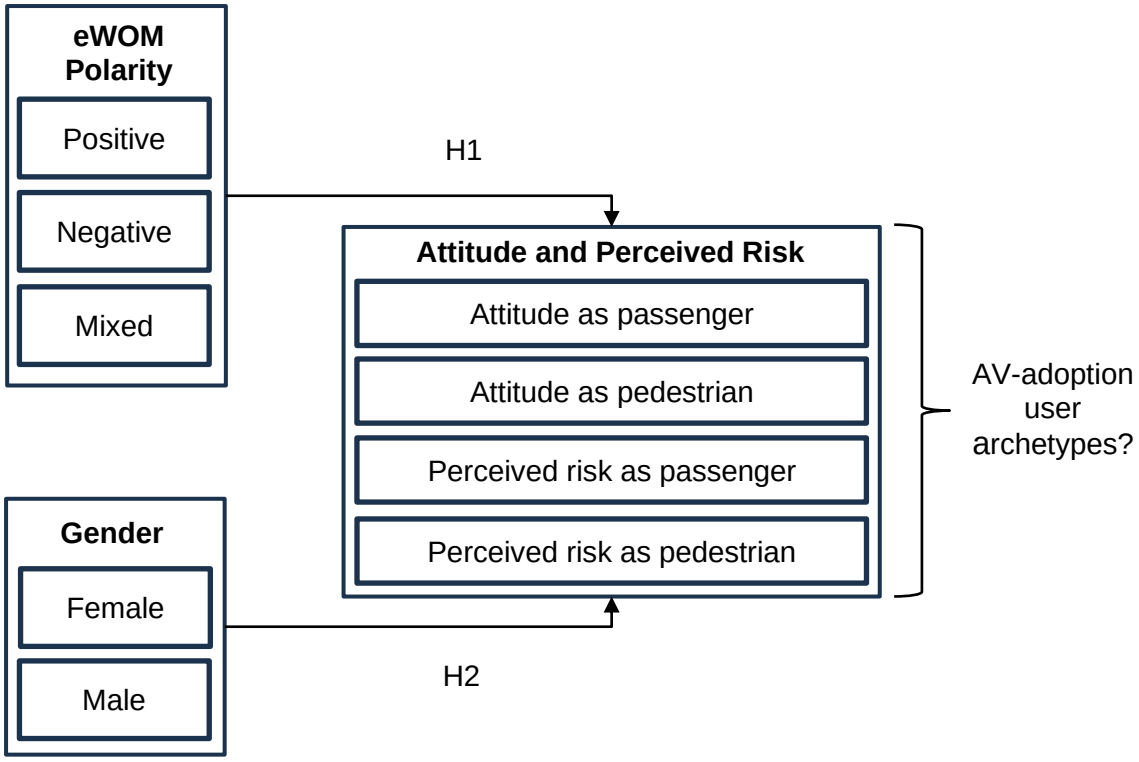

Figure 1: Research model.

Methods

Research design

An online experiment was conducted. It manipulated eWOM polarity (positive, negative, or mixed) as a between-participants factor. Participants, whose gender constituted another between-participants factor, were randomly assigned to one of the three conditions.

Participants were recruited using a combination of purposive and snowball sampling. The study invitation was disseminated through social media channels such as Facebook and Twitter. This ensured its reach among those who use social media and hence are likely to browse eWOM. Two inclusion criteria were imposed. First, participants must consider themselves fairly unapprised of AVs. This helped control for their a priori AV-related attitudes and risk perceptions. Second, they must have the experience of browsing eWOM about products, services, or brands—either in the

form of online reviews or general social media postings or blogs—to inform their consumption and/or usage decisions.

Experimental stimuli

The experimental stimuli of positive, negative, and mixed eWOM were drawn from Twitter, whose length restriction meant that the effect of message length could be controlled. Twitter was searched with the hashtag #AutonomousVehicles to collect tweets that would be used as the experimental stimuli. The plan was to expose participants in each experimental condition to four messages. Prior research has often required participants to read four tweets before responding to a questionnaire (Besalú et al., 2021; Koetke et al., 2021; Urakami et al., 2022). Using just one or two message(s) would come across as too random while having too many messages might have caused information overload.

After the search, the returned tweets were read one by one to identify entries that were clearly positive or negative or mixed. It emerged that no tweets contained both positive and negative sentiments. This could be attributed to Twitter's length restriction. Therefore, to operationalize mixed eWOM, this study uses a combination of positive and negative tweets. While participants in the positive and the negative eWOM conditions would be exposed to four positive and four negative tweets respectively, those in the mixed eWOM condition would be shown two positive and two negative tweets.

The process of reading tweets and categorizing them manually as either positive or negative continued until four positive and four negative tweets were obtained. The collected eight tweets were edited to remove references to brands and locations as well as usernames (@). Then, they were subjected to a pre-test involving

12 participants who read all the eight tweets in a random order. The participants were asked to comment on the clarity of the messages and classify each of them as positive or negative. Their comments led to the amendment of some of the messages to minimize ambiguity. All of them, nevertheless, identified the message polarity correctly for every tweet, confirming the successful manipulation of eWOM polarity. Table I presents the final experimental stimuli.

Table I: Positive and negative tweets for the experiment.

Polarity	**Tweets (Length in Words and Characters)**
Positive	• With autonomous vehicles, artificial intelligence will prevent potential accidents. Technology will use urgent measures to avoid crashes at all cost. (20 words, 151 characters) • Birds have a chance of being killed by air pollution. Gas motors are the cause. The solution is autonomous vehicles. They run on electricity and reduce air pollution. (28 words, 168 characters) • Experts are suggesting that autonomous vehicles could reduce the number of collisions by up to 93% in the future, leading to safer roads for drivers and passengers. (27 words, 166 characters) • Autonomous vehicles will save you a lot of time. You don't have to focus on driving and it drops you off at your destination and even looks for a parking spot. (31 words, 161 characters)
Negative	• Are the individuals promoting autonomous vehicles going to accept responsibility for failure and deaths caused? Why do they shy away from such crunch questions? (24 words, 162 characters) • Time to stop, breathe, do some appropriate research, and use it to design these autonomous vehicles properly. If not, a world of new and emergent forms of crash are coming. (30 words, 174 characters) • Introducing autonomous vehicles has a moral dimension: In the event of a fatal accident, will the people in the autonomous cars accept the decision made by technology? (27 words, 169 characters) • The introduction of autonomous vehicles may not improve road safety drastically. It would only give rise to more uncertainty and complex decision-making for everyone. (24 words, 168 characters)

Experimental procedure

The online experiment was set up using Qualtrics. The first page of the study website contained the participant information sheet and the consent form. It also

stated the inclusion criteria: Participants must consider themselves fairly unapprised of AVs and must have the experience of browsing eWOM.

Once individuals confirmed that they had read the participant information sheet and that they were eligible and happy to participate by responding to a series of tick-box questions, they were permitted to proceed to the main study that included four steps. In the first step, participants were introduced to the idea of AVs. They were informed that these vehicles largely rely on artificial intelligence to decide where to steer and when to brake. They were also told about alternative phrases such as “driverless cars” and “self-driving vehicles.”

In the second step, participants imagined coming across messages on AVs as they were browsing their social media feeds. They were then exposed to the experimental stimuli. In the positive and the negative eWOM conditions, participants were exposed to the four positive and the four negative tweets respectively in a random order. In the mixed eWOM condition, participants were randomly exposed to two positive and two negative tweets from the pool of eight. To eliminate order effects, half of the participants in the mixed eWOM condition saw positive content first while the other half was exposed to negative content first. No platform name was mentioned to avoid any potential biases. Furthermore, the tweets were presented as texts rather than Twitter screenshots.

In the third step, participants responded to a questionnaire (Table II), the face validity of which was assessed with the help of the 12 pre-test participants. Items measuring attitude were adapted from Böhm et al. (2017) while those measuring perceived risk were informed by Hulse et al. (2018). Information about age and gender was also sought.

In the final step, participants were debriefed. They were told that the messages that they read were randomly selected for the purpose of this research. The messages were not intended to unfairly advantage or disadvantage any brand or product. They were further invited to share the study invitation with their contacts via social media.

Table II: Conceptual definitions and questionnaire items.

Variables	**Questionnaire Items**
Attitude: degree of favorability toward AVs (Ajzen, 1991; Böhm et al., 2017).	
Attitude-passenger (Böhm et al., 2017)	• Using autonomous vehicles for travel is a good idea. • Traveling in autonomous vehicles would be fun. • As a passenger, I would like to interact with autonomous vehicles. [1 = strongly disagree, 7 = strongly agree]
Attitude-pedestrian (Böhm et al., 2017)	• Use of autonomous vehicles is good for pedestrians. • Watching autonomous vehicles on streets would be fun. • As a pedestrian, I would like to interact with autonomous vehicles. [1 = strongly disagree, 7 = strongly agree]
Perceived risk: subjective assessment of negative consequences associated with AV adoption (Gopinath and Narayanamurthy, 2022; Hulse et al., 2018).	
Perceived risk-passenger (Hulse et al., 2018)	• With autonomous vehicles, the likelihood of unwanted negative consequences to passengers' life is: • With autonomous vehicles, the potential of unwanted negative consequences to passengers' safety is: • With autonomous vehicles, the potential of unwanted negative consequences to passengers' health is: [1 = extremely low, 7 = extremely high]
Perceived risk-pedestrian (Hulse et al., 2018)	• With autonomous vehicles, the likelihood of unwanted negative consequences to pedestrians' life is: • With autonomous vehicles, the potential of unwanted negative consequences to pedestrians' safety is: • With autonomous vehicles, the potential of unwanted negative consequences to pedestrians' health is: [1 = extremely low, 7 = extremely high]

Analyses

The analyses involved two steps. First, a 3 (eWOM polarity: positive, negative, mixed) x 2 (gender: female, male) between-participants factorial multivariate analysis

of variance (MANOVA) was conducted. The set of dependent variables include attitude toward AVs from a passenger perspective, attitude toward AVs from a pedestrian perspective, perceived risk for passengers in AV, and perceived risk of AV for pedestrians. This helped test H1 and H2.

The second step of the analyses sought to address the exploratory research question. For this purpose, hierarchical cluster analysis was conducted (Ketchen and Shook, 1996; Tamimi and Sebastianelli, 2015). Ward's method was utilized to form clusters and Euclidean distance was used as the similarity measure (Banerjee and Chua, 2023; Zha et al., 2014). Next, one-way analysis of variance (ANOVA) tests were conducted to confirm if the identified user archetypes (clusters) were significantly different from one another in terms of attitudes and risk perceptions. Thereafter, two Chi-square tests were conducted to ascertain how the observed frequencies of user archetypes (cluster sizes) were related to eWOM polarity and gender. Figure 2 shows the overall research design process.

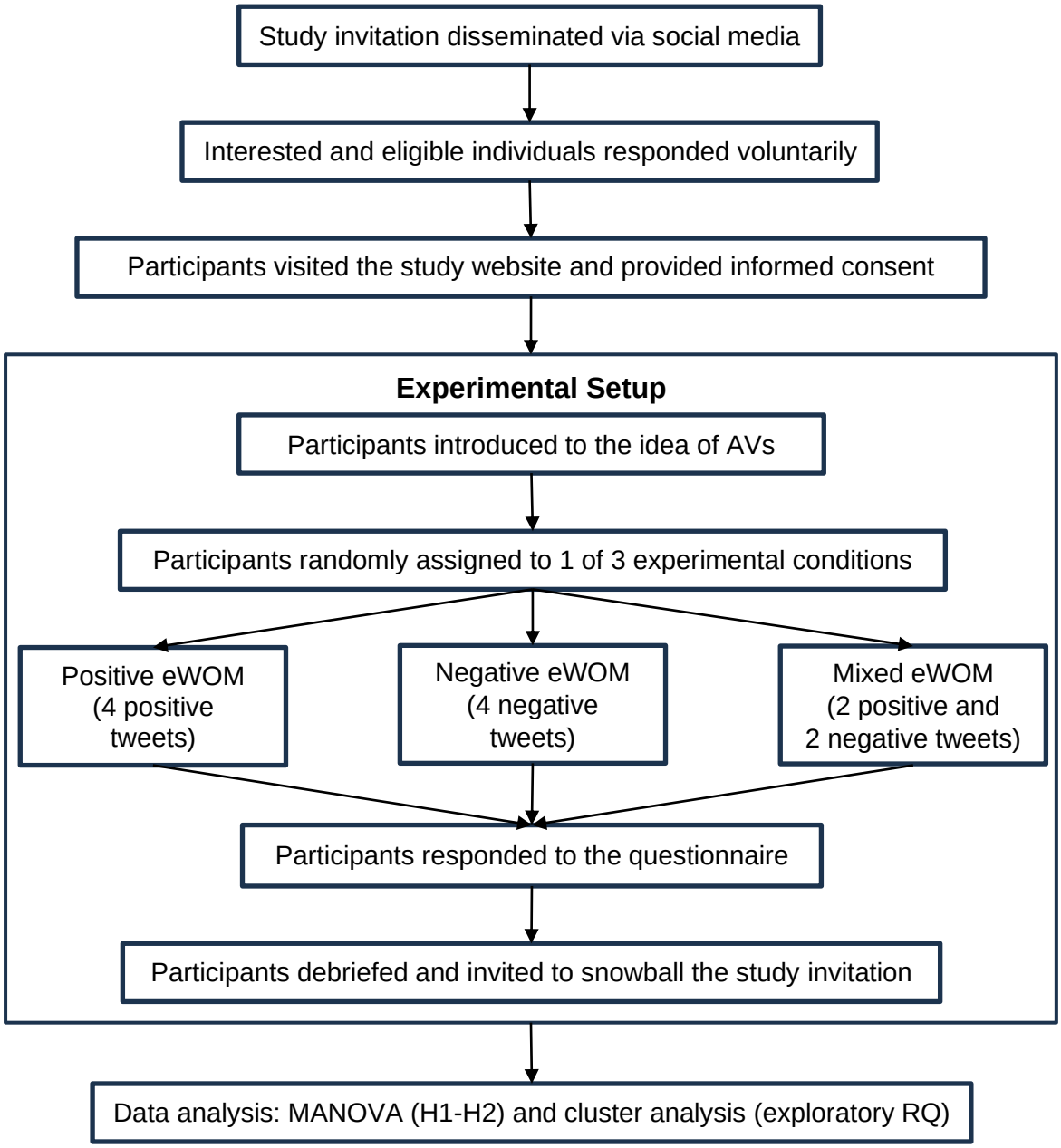

Figure 2: Research design and experimental setup.

Results

Descriptive statistics

The data for this study included complete responses from 294 participants (161 females and 133 males). Of them, 14 aged between 18 and 24 years, 159 were between 25 and 34 years old, 101 were between 35 and 44 years old, 13 were between

45 and 54 years old, four aged 55 years or above, and three preferred not to disclose their age. The descriptive statistics of the full dataset are summarized in Table III. Cronbach's alpha values were above .8, confirming internal consistency reliability.

Table III: Means, standard deviations, Cronbach's α, and correlations.

Variables	**M**	**SD**	**Cronbach's α**	**(1)**	**(2)**	**(3)**
Attitude-passenger (1)	2.71	1.28	.83			
Attitude-pedestrian (2)	3.06	1.46	.86	.72**		
Perceived risk-passenger (3)	3.1	1.4	.84	.1	.17**	
Perceived risk-pedestrian	3.14	1.48	.83	.11	.22**	.78**

Note. ** $p < .01$, N = 294.

Table IV presents the descriptive statistics as a function of eWOM polarity. Counter-intuitively, attitude scores in the negative eWOM condition were higher than those in the positive eWOM and the mixed eWOM conditions. Similarly, attitude scores in the positive eWOM condition were lower than those in the negative eWOM and the mixed eWOM conditions. Furthermore, risk perceptions in the positive eWOM and the negative eWOM conditions were lower than those in the mixed eWOM condition. Attitude from the perspective of passengers was consistently less favorable compared with that from the perspective of pedestrians. Perceived risk from the perspective of passengers was higher than that from the perspective of pedestrians only in the negative eWOM condition.

Table IV: Means ± standard deviations as a function of eWOM polarity.

Variables	**Positive eWOM (N = 91)**	**Negative eWOM (N = 101)**	**Mixed eWOM (N = 102)**
Attitude-passenger	2.59 ± 1.37	2.80 ± 1.24	2.74 ± 1.23
Attitude-pedestrian	2.86 ± 1.50	3.21 ± 1.52	3.07 ± 1.36
Perceived risk-passenger	2.88 ± 1.43	3.00 ± 1.35	3.41 ± 1.40
Perceived risk-pedestrian	2.94 ± 1.49	2.87 ± 1.26	3.59 ± 1.57

Table V presents the descriptive statistics as a function of gender. Females seemed to have more favorable attitudes than males, despite perceiving greater risks. Attitude from the perspective of passengers was consistently less favorable compared with that from the perspective of pedestrians. Perceived risk from the perspective of passengers was higher than that from the perspective of pedestrians only for females.

Table V: Means ± standard deviations as a function of gender.

Variables	**Females (N = 161)**	**Males (N = 133)**
Attitude-passenger	3.02 ± 1.34	2.34 ± 1.09
Attitude-pedestrian	3.37 ± 1.45	2.67 ± 1.38
Perceived risk-passenger	3.26 ± 1.29	2.91 ± 1.51
Perceived risk-pedestrian	3.22 ± 1.31	3.04 ± 1.65

Assumption check and outlier detection

The assumptions of MANOVA were checked. The normal QQ plots tended to be straight lines, suggesting fairly normal distributions. Inspection of the scatter plots between each pair of variables suggested reasonable linearity. All pairwise correlations were below .8 (cf. Table III), suggesting no multicollinearity (Pallant, 2005). Box's M test of equality of covariance matrices suggested violation of the homogeneity of variance-covariance matrices assumption. However, it is known to be overly stringent (Tabachnick and Fidell, 2001). Levene's test of equality of error variances suggested violation of the equal variances assumption for only one of the four dependent variables—perceived risk of AV for pedestrians. Hence, for this variable, a more conservative alpha level of .01 was used to determine statistical significance (Tabachnick and Fidell, 2001).

All that said, MANOVA is quite robust to violation of assumptions when the sample size is over 30 in each cell (Dattalo, 2013; Gravetter and Wallnau, 2000;

Pallant, 2005). In this study, cell size ranged from 40 (males in the positive eWOM condition) to 59 (females in the mixed eWOM condition).

To identify possible univariate outliers, two approaches were used: visual inspection of boxplots and mean vs. 5% trimmed mean comparisons (Pallant, 2005). The boxplot for attitude from the perspective of passengers revealed less than 15 outliers in the sample of 294. Those for the other three dependent variables did not indicate any outlier. Given their sparsity, outliers were not considered to be a problem.

The 5% trimmed mean of a variable refers to its mean obtained by eliminating the top and bottom 5% cases (Pallant, 2005). The 5% trimmed means for attitude toward AVs from a passenger perspective, attitude toward AVs from a pedestrian perspective, perceived risk for passengers in AV, and perceived risk of AV for pedestrians were 2.62, 2.99, 3.04, and 3.07 respectively. These were not drastically different from their means (cf. Table III), conveying little outlier influence. For these reasons, all data points were retained.

Furthermore, for multivariate outlier detection, Mahalanobis distance was calculated and compared against the chi-square critical value (Tabachnick and Fidell, 2001). For four dependent variables as is the case in this study, the critical value is 18.47 (Pallant, 2005). There were less than 10 multivariate outliers with Mahalanobis distance values exceeding 18.47. Hence, these few cases were retained to keep the sample representative of the population from which they were drawn. Removing them arbitrarily would not have been theoretically meaningful (Miller et al., 2014).

Effect of eWOM polarity and gender

A 3 (eWOM polarity: positive, negative, mixed) x 2 (gender: female, male) between-participants factorial MANOVA was conducted with the attitude and the

perceived risk scores as the dependent variables. Statistically significant differences emerged on the combined dependent variables in terms of eWOM polarity, $F(8, 570) = 2.84$, $p = .004$, Wilk's $\lambda = .92$, $\eta^2 = .04$. Thus, H1 was supported. In particular, the effect of eWOM polarity was non-significant on attitude toward AVs from a passenger perspective and attitude toward AVs from a pedestrian perspective but significant on perceived risk for passengers in AV [$F(2, 288) = 4.37$, $p = .01$, $\eta^2 = .03$], and perceived risk of AV for pedestrians [$F(2, 288) = 7.82$, $p < .001$, $\eta^2 = .05$]. Perceived risk for passengers in AV was the lowest in the positive eWOM condition (2.88 ± 1.43). According to post-hoc tests, it was comparable to that in the negative eWOM condition (3.00 ± 1.35) but significantly lower than that in the mixed eWOM condition (3.41 ± 1.40). Likewise, perceived risk of AV for pedestrians was comparable in the positive eWOM condition (2.94 ± 1.49) and the negative eWOM condition (2.87 ± 1.26) but significantly lower than that in the mixed eWOM condition (3.59 ± 1.57).

Statistically significant differences on the combined dependent variables also arose in terms of gender, $F(4, 285) = 7.47$, $p < .001$, Wilk's $\lambda = .90$, $\eta^2 = .09$. Thus, H2 was supported. Specifically, the effect of gender was significant on attitude toward AVs from a passenger perspective [$F(1, 288) = 22.67$, $p < .001$, $\eta^2 = .07$], attitude toward AVs from a pedestrian perspective [$F(1, 288) = 18.08$, $p < .001$, $\eta^2 = .06$], and perceived risk for passengers in AVs [$F(1, 288) = 4.40$, $p = .04$, $\eta^2 = .02$] but was non-significant on perceived risk of AVs for pedestrians. Attitude toward AVs was more favorable among females (passenger perspective: 3.02 ± 1.34, pedestrian perspective: 3.37 ± 1.45) than males (passenger perspective: 2.34 ± 1.09, pedestrian perspective: 2.67 ± 1.38). Perceived risk for passengers in AVs was higher among females (3.26 ± 1.29) than males (2.91 ± 1.51). All eWOM polarity x gender

interaction effects were non-significant. The results corresponding to each instance of the dependent variables are summarized in Table VI.

Table VI: Summary of the results of testing H1 and H2.

Hypotheses	**Dependent Variables**	**Test Outcome**
H1: Role of eWOM polarity	Attitude-passenger	Not supported
	Attitude-pedestrian	Not supported
	Perceived risk-passenger	Supported ($p = .01$, $\eta^2 = .03$)
	Perceived risk-pedestrian	Supported ($p < .001$, $\eta^2 = .05$)
H2: Role of gender	Attitude-passenger	Supported ($p < .001$, $\eta^2 = .07$)
	Attitude-pedestrian	Supported ($p < .001$, $\eta^2 = .06$)
	Perceived risk-passenger	Supported ($p = .04$, $\eta^2 = .02$)
	Perceived risk-pedestrian	Not supported

Clusters of attitudes and risk perceptions engendered by eWOM

Hierarchical cluster analysis was conducted to group the 294 participants based on their attitudes and risk perceptions engendered by eWOM polarity. Considering the need for parsimony, examination of the dendrogram and the agglomeration schedule suggested a four-cluster solution. The ANOVA results confirmed that the four clusters were significantly different from one another in terms of attitude toward AVs from a passenger perspective [$F(3, 290) = 90.50$, $p < .001$, $\eta^2 = .48$], attitude toward AVs from a pedestrian perspective [$F(3, 290) = 188.37$, $p < .001$, $\eta^2 = .66$], perceived risk for passengers in AV [$F(3, 290) = 131.78$, $p < .001$, $\eta^2 = .58$], and perceived risk of AV for pedestrians [$F(3, 290) = 112.66$, $p < .001$, $\eta^2 = .54$].

The clusters are summarized in Table VII. Cluster 1, the biggest cluster, was labeled as *AV watchfuls*. This is because it is characterized by middling scores on attitude and risk, from the perspectives of both passengers and pedestrians. Cluster 2 was labeled as *AV optimists*. Individuals in this cluster had high attitude scores despite perceiving a high risk with AVs. Cluster 3 was labeled as *AV nonchalants*.

Characterized by low attitude scores and low risk scores, individuals in this cluster appeared to be rather indifferent. Cluster 4, the smallest cluster, is characterized by low attitude scores and high risk scores. Participants in this clusters are therefore called *AV skeptics*.

Table VII: Summary of the four clusters (means ± standard deviations).

Variables	**Cluster 1 (N = 115)**	**Cluster 2 (N = 110)**	**Cluster 3 (N = 39)**	**Cluster 4 (N = 30)**
Attitude-passenger	2.25 ± .62	3.81 ± 1.27	1.42 ± .63	2.17 ± .66
Attitude-pedestrian	2.44 ± .72	4.52 ± 1.10	1.29 ± .46	2.38 ± .68
Perceived risk-passenger	3.04 ± .88	3.23 ± 1.12	1.08 ± .18	5.50 ± .80
Perceived risk-pedestrian	2.94 ± .89	3.36 ± 1.27	1.19 ± .40	5.62 ± .91
	AV watchfuls	*AV optimists*	*AV nonchalants*	*AV skeptics*

The proportion of participants in the four clusters differed significantly as a function of eWOM polarity, χ^2 (6, N = 294) = 15.03, Cramer's V = .16, p = .02. Positive eWOM was most likely to give rise to AV watchfuls (34/91, 37.36%). This was also true for negative eWOM (46/101, 45.54%). In contrast, mixed eWOM mostly tended to result in AV optimists (44/102, 43.14%).

The proportion of participants in the four clusters also varied significantly as a function of gender, χ^2 (3, N = 294) = 21.68, Cramer's V = .27, p < .001. While majority of the females were AV optimists (75/161, 46.58%), majority of the males turned out to be AV watchfuls (55/133, 41.35%). Table VIII summarizes the cluster sizes as a function of eWOM polarity and gender.

Table VIII: Cluster sizes as a function of eWOM polarity and gender.

eWOM Polarity and Gender	**AV watchfuls**	**AV optimists**	**AV nonchalants**	**AV skeptics**	**Total**
Positive eWOM	34	30	18	9	91
Negative eWOM	46	36	14	5	101
Mixed eWOM	35	44	7	16	102
Total	**115**	**110**	**39**	**30**	**294**
Females	60	75	10	16	161
Males	55	35	29	14	133
Total	**115**	**110**	**39**	**30**	**294**

Discussion

The study findings are discussed as follows: With respect to H1, eWOM polarity had a significant effect on perceived risk but not on attitude. While prior research has consistently identified attitude as a key determinant of AV adoption and perceived risk as a major deterrent (Gopinath and Narayanamurthy, 2022), this paper extends the literature by revealing that eWOM polarity shapes the deterrent more readily than the determinant. Moreover, perceived risk for passengers in AVs was significantly lower in the positive and the negative eWOM conditions than that in the mixed eWOM condition. The same pattern emerged for perceived risk of AVs for pedestrians too. In this vein, the literature suggested two competing possibilities when positive, negative, and mixed polarities are juxtaposed. On the one hand, perceived risk could have been the highest in the negative eWOM condition because of negativity bias kicking in (Bachleda and Berrada-Fathi, 2016; López-López and Parra, 2016). On the other, mixed eWOM could have a stronger sway for highlighting both sides of the story (Cheung and Thadani, 2012; Prendergast et al., 2016). This study finds support for the latter: Perceived risk was the highest in the mixed eWOM condition. Compared with positive or negative eWOM alone, mixed eWOM—as a cultivation nexus (Gerbner and Gross, 1976; Liu, 2021; Stein et al., 2021; Wei et al.,

2020)—seems to have allowed prospective AV passengers and pedestrians to deliberate on potential risks more carefully.

With respect to H2, males and females differed from each other in terms of attitude toward AVs from a passenger perspective, attitude toward AVs from a pedestrian perspective, and perceived risk for passengers in AVs. Attitude toward AVs was more favorable among females. This suggests that females' reluctance to adopt AVs, documented in prior studies (Hulse et al., 2018; Kyriakidis et al., 2015; Schoettle and Sivak, 2014), could be mitigated through eWOM. In addition, perceived risk for passengers in AVs was also higher among females. Thus, compared with males, females appear to have been swayed more easily by eWOM. This could be attributed to the selectivity hypothesis, which expects females to pay closer attention to eWOM and elaborate on the message claims more extensively than males (Bae and Lee, 2010; Meyers-Levy, 1988; Prendergast et al., 2016; Zhang et al., 2014). However, males and females showed comparable levels of perceived risk for pedestrians. Hulse et al. (2018) showed that AVs are perceived as being riskier when being a passenger than a pedestrian. This study adds to the earlier finding by showing that only the riskier perspective of passengers is dependent on gender.

With respect to the exploratory research question, four AV-adoption user archetypes were identified based on attitudes and risk perceptions. These include AV watchfuls, AV optimists, AV nonchalants, and AV skeptics. This typology goes beyond the generic, demographic- and personality-based user archetypes suggested by Rogers (2003) and offers a viable approach to segment prospective AV users. Moreover, while positive and negative eWOM were likely to give rise to AV watchfuls, mixed eWOM was likely to result in AV optimists. Additionally, females turned out to be more likely to be AV optimists while males were likely to be AV

watchfuls. It is a promising sign that a mix of positive and negative eWOM can engender AV optimists even among females, who have not usually been too enthusiastic about AVs (Hulse et al., 2018; Kyriakidis et al., 2015).

Conclusion

Drawing on cultivation theory and social influence theory, this study investigated how AV-related eWOM of different polarities affects attitude and perceived risk from the perspectives of both passengers and pedestrians, and whether any gender differences exist. It also sought to identify AV-adoption user archetypes. An online experiment was conducted, manipulating eWOM polarity (positive, negative, or mixed) as a between-participants factor. Perceived risk was found to be the highest in the mixed eWOM condition. Males and females differed from each other in terms of attitude toward AVs from a passenger perspective, attitude toward AVs from a pedestrian perspective, and perceived risk for passengers in AVs. Four AV-adoption user archetypes were identified, namely, AV watchfuls, AV optimists, AV nonchalants, and AV skeptics.

Theoretical contributions

The paper makes a number of important theoretical contributions. First, it brings together two disparate streams of human-computer interaction literature: one that focuses on the adoption of AVs (e.g., Gopinath and Narayanamurthy, 2022; Hulse et al., 2018; Kyriakidis et al., 2015) and the other that focuses on the effects of eWOM (e.g., Cheung and Thadani, 2012; Prendergast et al., 2016). Building on existing literature that describes users' online sentiments toward AVs (e.g., Jing et al., 2023; Penmetsa et al., 2021), this paper sheds light on how such eWOM is interpreted

by prospective AV passengers and pedestrians. Thus, it initiates a new line of academic discourse dealing with how eWOM could dictate AV adoption.

Second, this paper conceptualizes attitude granularly as attitude toward AVs from a passenger perspective, and attitude toward AVs from a pedestrian perspective. Similarly, it conceptualizes perceived risk as perceived risk for passengers in AVs, and perceived risk of AVs for pedestrians. Compared with prior studies that have often overlooked the role of road user types, the paper presents a more expansive conceptualization of AV-related attitudes and risk perceptions to derive new insights. For example, males and females differed from each other in terms of attitude toward AVs from a passenger perspective, attitude toward AVs from a pedestrian perspective, and perceived risk for passengers in AVs. However, they were similar in terms of perceived risk of AVs for pedestrians. By revealing such nuances, the paper highlights that a study of AV adoption would be incomplete if perspectives from passengers and pedestrians are conflated.

Third, although public opinion research has found males to embrace AVs more readily than females (Hulse et al., 2018; Kyriakidis et al., 2015; Schoettle and Sivak, 2014), none of these studies considered information seeking behaviors, which are sensitive to gender effects. In general, females have been shown to depend on marketer-generated advertisements while males turn to eWOM (Sharma and Mishra, 2022). Extending prior research that has revealed females' reluctance to adopt AVs, this paper shows that eWOM might well turn females into AV optimists.

Finally, the paper develops a typology of prospective AV users: AV watchfuls, AV optimists, AV nonchalants, and AV skeptics. It shows how eWOM of different polarities, as a cultivation nexus (Gerbner and Gross, 1976; Hung et al., 2023;

Kelman, 2006; Liu, 2021; Stein et al., 2021; Wei et al., 2020), influences attitudes and risk perceptions to engender these AV-adoption user archetypes.

Practical implications

The paper offers two implications for practice. First, the AV-adoption user archetypes developed in this paper could be utilized to segment the AV market. It is promising that AV optimists and AV watchfuls outnumber AV nonchalants and AV skeptics. Therefore, for a start, commercialization efforts and rollout plans should be specifically targeted at the optimists and the watchfuls. Moreover, marketing campaigns could be developed to better foster a favorable attitude and attenuate any risk perceptions among the nonchalants and the skeptics. Safety statistics could be included in these campaigns to inspire confidence that AVs are safe to operate.

Second, while the sentiment around AVs is known to lag market expectation (Tan et al., 2022), this paper highlights the possibility of leveraging the power of eWOM to address the sentiment-expectation gap. Given that both the upsides and downsides of AVs have far-reaching ramifications for ordinary users, interested stakeholders such as firms and governments are obviously interested to identify factors that would tilt the balance. These stakeholders should use their social media pages to post AV-related content as well as encourage lay users to respond to those messages. As mixed eWOM was found likely to engender AV optimists, automakers should be open to sharing not only the pros but also the cons of AVs on their social media pages. Painting a realistic picture regarding what AVs have to offer can be useful. Efforts could be made to personalize the social media content based on gender. Females could be targeted proactively as they were found to have a more favorable attitude toward AVs than males after reading eWOM.

Limitations and future research directions

There are four limitations in this study that future research needs to address. First, it exposed participants to fixed sets of four tweets. While such an approach is common in prior studies (Besalú et al., 2021; Kim et al., 2021; Koetke et al., 2021; Urakami et al., 2022), future research in this area could consider exposing participants to a wider selection of posts for better generalizability.

Second, this study considered positive, negative, and mixed polarities but did not reveal nuances as a function of the degrees of positivity and negativity in eWOM. Future scholarly inquiry in this area should examine how grades of positivity and negativity in AV-related eWOM affect attitudes and perceptions.

Third, although the study was focused on individuals who considered themselves to be unapprised of AVs, their prior attitudes and perceptions were not measured. Future research could carry out pretest-posttest experiments to better understand the effect of AV-related eWOM on the change in individuals' attitude and perceived risk.

Finally, the study did not consider the role of culture and its interplay with variables such as age and driving experience. Depending on one's socio-cultural situation, individuals can exhibit different levels of masculinity and femininity irrespective of gender (Putrevu, 2001). Therefore, scholars are invited to replicate this study in masculine and feminine cultures. Given that new technology such as AVs are bound to breed uncertainty, the extent to which the current findings hold good in high and low uncertainty avoidance cultures is also worth investigating. Additionally, research on the interplay between gender and other factors such as age, income, possession of a driving license, and driving competence in different countries and

cultural settings is important to provide a more comprehensive understanding of the dynamics of AV adoption.

References

Ajzen, I. (1991), "The theory of planned behavior", *Organizational Behavior and Human Decision Processes*, Vol. 50 No. 2, pp.179-211.

Bachleda, C., and Berrada-Fathi, B. (2016), "Is negative eWOM more influential than negative pWOM?", *Journal of Service Theory and Practice*, Vol. 26 No. 1, pp.109-132.

Bae, S. and Lee, T. (2010), "Gender differences in consumers' perception of online consumer reviews", *Electronic Commerce Research*, Vol. 11 No. 2, pp.201-214.

Banerjee, S., and Chua, A. (2017), "Theorizing the textual differences between authentic and fictitious reviews: Validation across positive, negative and moderate polarities", *Internet Research*, Vol. 27 No. 2, pp.321-337.

Banerjee, S., and Chua, A. (2023), "Understanding online fake review production strategies", *Journal of Business Research*, Vol. 156, 113534.

Banerjee, S., Singh, J.P., Dwivedi, Y K., and Rana, N.P. (2021), "Social media analytics for end-users' expectation management in information systems development projects", *Information Technology & People*, Vol. 34 No. 6, pp.1600-1614.

Baumann, M.F., Weinberger, N., Maia, M., and Schmid, K. (2023), "User types, psycho-social effects and societal trends related to the use of consumer health technologies", *Digital Health*, Vol. 9, pp.1-17.

Bernhard, C., Oberfeld, D., Hoffmann, C., Weismüller, D., and Hecht, H. (2020), "User acceptance of automated public transport", *Transportation Research Part F: Traffic Psychology and Behaviour*, Vol. 70, pp.109–123.

Besalú, R., Pont-Sorribes, C., and Martí, A. (2021), "Perceived credibility of tweets by opinion leaders during the COVID-19 pandemic in Spain", *International Journal of Communication*, Vol. 15, pp.5158-5185.

Böhm, P., Kocur, M., Firat, M., and Isemann, D. (2017), "Which factors influence attitudes towards using autonomous vehicles?", *Proceedings of the International Conference on Automotive User Interfaces and Interactive Vehicular Applications Adjunct*, ACM, New York, pp.141-145.

Cheung, C., and Thadani, D. (2012), "The impact of electronic word-of-mouth communication: A literature analysis and integrative model", *Decision Support Systems*, Vol. 54 No. 1, pp.461-470.

Cho, E., and Jung, Y. (2018), "Consumers' understanding of autonomous driving", *Information Technology & People*, Vol. 31 No. 5, pp.1035-1046.

Dattalo, P. (2013), *Analysis of Multiple Dependent Variables*, Oxford University Press.

Davis, F.D. (1989), "Perceived usefulness, perceived ease of use, and user acceptance of information technology", *MIS Quarterly*, Vol. 13 No. 3, pp.319-340.

Duan, W., Gu, B. and Whinston, A. (2008), "The dynamics of online word-of-mouth and product sales—An empirical investigation of the movie industry", *Journal of Retailing*, Vol. 84 No. 2, pp.233-242.

Eagly, A.H. (1987), *Sex Differences in Social Behavior: A Social-Role Interpretation*, Lawrence Erlbaum Associates, New Jersey, NJ.

Eagly, A.H., and Wood, W. (1991), "Explaining sex differences in social behavior: A meta-analytic perspective", *Personality and Social Psychology Bulletin*, Vol. 17 No. 3, pp.306-315.

Frank, D.A., Jacobsen, L.F., Søndergaard, H.A., and Otterbring, T. (2023), "In companies we trust: Consumer adoption of artificial intelligence services and the role of trust in companies and AI autonomy", *Information Technology & People*, Vol. 36 No. 8, pp.155-173.

Gerbner, G., and Gross, L. (1976), "Living with television: The violence profile", *Journal of Communication*, Vol. 26 No. 2, pp.172-199.

Golbabaei, F., Yigitcanlar, T., Paz, A., and Bunker, J. (2020), "Individual predictors of autonomous vehicle public acceptance and intention to use: A systematic review of the literature", *Journal of Open Innovation: Technology, Market, and Complexity*, Vol. 6 No. 4, 106.

Gopinath, K., and Narayanamurthy, G. (2022), "Early bird catches the worm! Meta-analysis of autonomous vehicles adoption–Moderating role of automation level, ownership and culture", *International Journal of Information Management*, Vol. 66, 102536.

Gravetter, F.J. and Wallnau, L.B. (2000), *Statistics for the Behavioral Sciences*, Wadsworth, Belmont, CA.

Hernández-Fernández, A., Mora, E., and Hernández, M. (2019), "When a new technological product launching fails: A multi-method approach of facial recognition and E-WOM sentiment analysis", *Physiology & Behavior*, Vol. 200, pp.130-138.

Hőgye-Nagy, Á., Kovács, G., and Kurucz, G. (2023), "Acceptance of self-driving cars among the university community: Effects of gender, previous experience, technology adoption propensity, and attitudes toward autonomous vehicles", *Transportation Research Part F: Traffic Psychology and Behaviour*, Vol. 94, pp.353-361.

Hulse, L.M., Xie, H., and Galea, E.R. (2018), “Perceptions of autonomous vehicles: Relationships with road users, risk, gender and age”, *Safety Science*, Vol. 102, pp.1-13.

Hung, S.W., Chang, C.W., and Chen, S.Y. (2023), “Beyond a bunch of reviews: The quality and quantity of electronic word-of-mouth”, *Information & Management*, Vol. 60 No. 3, 103777.

Hwang, Y., Choi, S. and Mattila, A. (2018), “The role of dialecticism and reviewer expertise in consumer responses to mixed reviews”, *International Journal of Hospitality Management*, Vol. 69, pp.49-55.

Kahneman, D., and Tversky, A. (1979), “Prospect theory: An analysis of decision under risk”, *Econometrica: Journal of the Econometric Society*, Vol. 47 No. 2, pp.263-291.

Kelman, H.C. (2006), “Interests, relationships, identities: Three central issues for individuals and groups in negotiating their social environment”, *Annual Review of Psychology*, Vol. 57, pp.1-26.

Ketchen, D.J. and Shook, C.L. (1996), “The application of cluster analysis in strategic management research: An analysis and critique”, *Strategic Management Journal*, Vol. 17 No. 6, pp.441-458.

Kim, M., Song, D., and Jang, A. (2021), “Consumer response toward native advertising on social media: The roles of source type and content type”, *Internet Research*, Vol. 31 No. 5, pp.1656-1676.

Kitirattarkarn, G.P., Tao, W., and Tsai, W. (2021), “Intended audience and valence of electronic word-of-mouth on social media: A study of Dutch consumers”, *Internet Research*, Vol. 31 No. 3, pp.990-1017.

Koetke, J., Schumann, K., and Porter, T. (2021), "Trust in science increases conservative support for social distancing", *Group Processes & Intergroup Relations*, Vol. 24 No. 4, pp.680-697.

Kol, O., and Levy, S. (2023), "Men on a mission, women on a journey-Gender differences in consumer information search behavior via SNS: The perceived value perspective", *Journal of Retailing and Consumer Services*, Vol. 75, 103476.

Kyriakidis, M., Happee, R., and de Winter, J.C. (2015), "Public opinion on automated driving: Results of an international questionnaire among 5000 respondents", *Transportation Research Part F: Traffic Psychology and Behaviour*, Vol. 32, pp.127-140.

Li, S.C.S. (2020), "Lifestyles, technology clustering, and the adoption of over-the-top television and Internet protocol television in Taiwan", *International Journal of Communication*, Vol. 14, pp.2017-2035.

Lin, X., Featherman, M. and Sarker, S. (2017), "Understanding factors affecting users' social networking site continuance: A gender difference perspective", *Information & Management*, Vol. 54 No. 3, pp.383-395.

Liu, F., Xiao, B., Lim, E.T., and Tan, C.W. (2017), "Investigating the impact of gender differences on alleviating distrust via electronic word-of-mouth", *Industrial Management & Data Systems*, Vol. 117 No. 3, pp.620-642.

Liu, P.L. (2021), "COVID-19 information on social media and preventive behaviors: Managing the pandemic through personal responsibility", *Social Science & Medicine*, Vol. 277, 113928.

López-López, I., and Parra, J.F. (2016), “Is a most helpful eWOM review really helpful? The impact of conflicting aggregate valence and consumer’s goals on product attitude”, *Internet Research*, Vol. 26 No. 4, pp.827-844.

Jing, P., Wang, B., Cai, Y., Wang, B., Huang, J., Yang, C., and Jiang, C. (2023), “What is the public really concerned about the AV crash? Insights from a combined analysis of social media and questionnaire survey”, *Technological Forecasting and Social Change*, Vol. 189, 122371.

Man, S.S., Xiong, W., Chang, F., and Chan, A.H.S. (2020), “Critical factors influencing acceptance of automated vehicles by Hong Kong drivers”, *IEEE Access*, Vol. 8, pp.109845-109856.

Meyers-Levy, J. (1988), “The influence of sex roles on judgment”, *Journal of Consumer Research*, Vol. 14 No. 4, pp.522-530.

Miller, H., Lefebvre, O., Lyon, P., Nelson, J., and Molet, M. (2014), “A focused attention intervention for preventing the recovery of initial learning”, *Cognitive Therapy and Research*, Vol. 38, pp.652-659.

Mishra, A., Maheswarappa, S., Maity, M., and Samu, S. (2018), “Adolescent’s eWOM intentions: An investigation into the roles of peers, the Internet and gender”, *Journal of Business Research*, Vol. 86, pp.394-405.

Nordhoff, S., de Winter, J., Payre, W., van Arem, B., and Happee, R. (2019), “What impressions do users have after a ride in an automated shuttle? An interview study”, *Transportation Research Part F: Traffic Psychology and Behaviour*, Vol. 63, pp.252-269.

Pallant, J. (2005), *SPSS Survival Manual: A Step by Step Guide to Data Analysis using SPSS for Windows (version 12)*, Allen & Unwin, Sydney.

Penmetsa, P., Sheinidashtegol, P., Musaev, A., Adanu, E.K., and Hudnall, M. (2021), "Effects of the autonomous vehicle crashes on public perception of the technology", *IATSS Research*, Vol. 45 No. 4, pp.485-492.

Petrescu, M., Namin, A., and Richard, M.O. (2023), "Technology within cultures: Segmenting the wired consumers in Canada, France, and the USA", *Journal of Business Research*, Vol. 164, 113972.

Pettigrew, S., Worrall, C., Talati, Z., Fritschi, L., and Norman, R. (2019), "Dimensions of attitudes to autonomous vehicles", *Urban, Planning and Transport Research*, Vol. 7 No. 1, pp.19-33.

Prendergast, G., Paliwal, A., and Chan, K. (2016), "Trust in online recommendations: An evolutionary psychology perspective", *International Journal of Advertising*, Vol. 37 No. 2, pp.199-216.

Putrevu, S. (2001), "Exploring the origins and information processing differences between men and women: Implications for advertisers", *Academy of Marketing Science Review*, Vol. 10 No. 1, pp.1-14.

Rahman, M.M., Deb, S., Strawderman, L., Burch, R., and Smith, B. (2019), "How the older population perceives self-driving vehicles", *Transportation Research Part F: Traffic Psychology and Behaviour*, Vol. 65, pp.242-257.

Rhim, J., Lee, G.B., and Lee, J.H. (2020), "Human moral reasoning types in autonomous vehicle moral dilemma: A cross-cultural comparison of Korea and Canada", *Computers in Human Behavior*, Vol. 102, pp.39-56.

Robey, D., Im, G., and Wareham, J.D. (2008), "Theoretical foundations of empirical research on interorganizational systems: Assessing past contributions and guiding future directions", *Journal of the Association for Information Systems*, Vol. 9 No. 9, pp.497-518.

Rogers, E.M. (2003), *Diffusion of Innovations*, Free Press, New York, NY.

Rothenbücher, D., Li, J., Sirkin, D., Mok, B., and Ju, W. (2016), "Ghost driver: A field study investigating the interaction between pedestrians and driverless vehicles", *Proceedings of the International Symposium on Robot and Human Interactive Communication*, IEEE, New York, pp.795–802.

Schoettle, B. and Sivak, M. (2014), A survey of public opinion about autonomous and self-driving vehicles in the U.S., the U.K., and Australia, University of Michigan Transportation Research Institute, Ann Arbor, MI.

Sharma, I., and Mishra, S. (2022), "Quantifying the consumer's dependence on different information sources on acceptance of autonomous vehicles", *Transportation Research Part A: Policy and Practice*, Vol. 160, pp.179-203.

Sohaib, M., Hui, P., and Akram, U. (2018), "Impact of eWOM and risk-taking in gender on purchase intentions: Evidence from Chinese social media", *International Journal of Information Systems and Change Management*, Vol. 10 No. 2, pp.101-122.

Stein, J.P., Krause, E., and Ohler, P. (2021), "Every (Insta) Gram counts? Applying cultivation theory to explore the effects of Instagram on young users' body image", *Psychology of Popular Media*, Vol. 10 No. 1, pp.87-97.

Tabachnick, B.G. and Fidell, L.S. (2001), *Using Multivariate Statistics*, HarperCollins, New York, NY.

Tamimi, N., and Sebastianelli, R. (2015), "The relative importance of e-tailer website attributes on the likelihood of online purchase", *Internet Research*, Vol. 25 No. 2, pp.169-183.

Tan, H., Zhao, X., and Yang, J. (2022), “Exploring the influence of anxiety, pleasure and subjective knowledge on public acceptance of fully autonomous vehicles”, *Computers in Human Behavior,* Vol. 131, 107187.

Urakami, J., Kim, Y., Oura, H., and Seaborn, K. (2022), “Finding strategies against misinformation in social media: A qualitative study”, *Proceedings of the CHI Conference on Human Factors in Computing Systems Extended Abstracts*, ACM, New York, pp.1-7.

Wei, Y., McIntyre, F. S., and Straub, D. (2020), “Does micro-blogging lead to a more positive attitude toward a brand?—A perspective of cultivation theory”, *Journal of Promotion Management,* Vol. 26 No. 4, pp.504-523.

Zha, X., Zhang, J., Yan, Y., and Xiao, Z. (2014), “User perceptions of e-quality of and affinity with virtual communities: The effect of individual differences”, *Computers in Human Behavior*, Vol. 38, pp.185-195.

Zhang, K.Z., Cheung, C.M., and Lee, M.K. (2014), “Examining the moderating effect of inconsistent reviews and its gender differences on consumers’ online shopping decision”, *International Journal of Information Management*, Vol. 34 No. 2, pp.89-98.

Zhao, K., Stylianou, A.C., and Zheng, Y. (2018), “Sources and impacts of social influence from online anonymous user reviews”, *Information & Management*, Vol. 55 No. 1, pp.16-30.