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Word of mouth and behavioural intentions of the automated bus service

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ABSTRACT

Automation technology has received great attention recently and been expected to play an important role in future transport systems. Understanding determinants of travellers' intention to use the bus and recommend the service to others is critical to promote such new travel modes. Although previous studies have focused on plausible scenarios based on hypothetical behavioural reactions, predicted adoption intention and recommendation behaviour may not be consistent with those exhibited when the users are exposed to the real automated bus service. Using a panel survey conducted in Stockholm, where an automated bus services is currently operating in the mixed traffic environment on the public road, this study addresses this research gap by investigating public acceptance and usage of these automated buses. Applying a behavioural model, this study explores key influencing factors of automated bus use and word of mouth intention. The results indicate that users' needs and travel demands have a strong power to influence people's intentions to use such a new public travel mode and recommend the service to others. Furthermore, individuals' behaviour intention is found to have no significant effect on actual behaviour in this study, which suggests a gap between intention and action.

1. Introduction

Automation technology has been promoted by many authorities and industries as a possible way to revolutionise the future for urban mobility. This new technology has the potential to significantly change and improve the current transport system (Bosch et al., 2016; Chen et al., 2016; Fagnant & Kockelman, 2014, 2015; Fraedrich et al., 2018; González-González et al., 2019; Jamson et al., 2013; Lee & Hess, 2020; Milakis et al., 2017; Narayanan et al., 2020; Olia et al., 2018; Simonia et al., 2019; Talebpour & Mahmassani, 2016; Wadud et al., 2016; Zachariah et al., 2014). Vehicle automation also holds the potential to benefit public transport system through the implementation of partially or fully automated buses (Tirachini & Antoniou, 2020). Introducing automation technology into public transport systems may improve road safety (Dong et al., 2019), increase service security and reliability (Cao & Ceder, 2019; Strathman et al., 2002), reduce bus fares, because of no driver costs (Abe, 2019; Piao et al., 2016; Winter et al., 2019), enable more frequent bus services and larger networks, and eventually enhance public transit accessibility and capacity (Abe, 2019; Lutin & Kornhauser, 2014). Although automation technology has potential to bring benefits to public transport systems, transition to automated buses is only possible if this new travel mode is accepted and used by the public (Alessandrini et al., 2014; Guo et al., 2020; Herrenkind et al., 2019; Nordhoff et al., 2018).

To gain a better understanding of different types of human behaviour intentions, several psychological theories have been identified and extensively used. In the context of urban transport, the theory of reasoned action (TRA), the theory of planned behaviour (TPB), the technology acceptance model (TAM), and the unified theory of acceptance and use of technology (UTAUT) have been discussed widely for predicting individuals' acceptance and usage of travel modes (Bamberg et al., 2011). According to these behavioural models, people's behaviour intention is influenced by attitudes and subjective norms towards the behaviour, and subsequently influences the actual behaviour.

Many behavioural models were used to investigate the acceptance and behavioural intentions for new technology. In the last decades, in the transportation literature, theoretical frameworks were developed to examine social-psychological factors on individuals' decisions to use the automated transport system. For example, proposing an extended TAM, Chen (2019) showed that attitude demonstrates as a strong predictor of

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behavioural intention, implying users who hold positive attitudes towards the autonomous shuttle as an alternative of current public transport are more likely to use it in the future. Similarly, developing an extended TPB, Jing et al. (2019) found that subjective norm is the most critical factor affecting travellers' intention to use autonomous vehicles; a recommendation to use the new transport system may make people decide to try the service. These theory-based models contributed to explain the impact of individuals' attitudes and social norms on individuals' acceptance and usage of the new automated transport system. However, the process of introducing a new technology into market is not always smooth. Many technological innovations fail to satisfy users' expectations and needs and may thus get abandoned before their launch into the market. To the authors knowledge, the impact of travellers' expectations and needs on public acceptance of a new technology has so far not been studied based on the theoretical background. To fill this knowledge gap, our work conceptualizes a behavioural model by adding users' needs as the determinants of travellers' behavioural intention to the theoretical framework.

In addition, the development of vehicle automation technology is still in the early phase. Based on social-psychological theories, while a number of studies have been done to examine the public acceptance of the automated transportation mode, most previous studies are obtained from hypothetical scenarios. In the last decade, with the development of the automated driving technology, several pilot projects have carried out across the world. For example, in the United States, many automated shuttle deployment projects have taken place in many major cities in the US including Milo Project in Texas, Mmcity automated shuttle pilot lead by the University of Michigan, Smart Circuit pilot in Ohio, the MnDOT pilot project in Minnesota, Little Roady the semi-automated shuttle pilot project in Rhode Island, etc. (Haque & Brakewood, 2020). Similarly, many automated buses pilot projects were carried out in various European countries (e.g., CityMobile funded by the EU, GATEway in the United Kingdom, Sion SmartShuttle in Switzerland, EUREF in Germany; WEPods in the Netherlands, SOHJOA in Finland, Digibus in Austria, etc.). Several other countries are also in the testing phrase, including driverless shuttle trail project operated in the Mid-North coast city of Newcastle, driverless bus 'Murray' operated in the South Australia, trail experiment in the rural community of Nishikata, Japan, Alphaba Smart Bus Demonstration in Shenzhen, China, etc. However, most cases are based on the hypothetical scenario test approach. Automated buses are run in trail-based setting but not in the mixed road setting through the integration with existing transport service in the neighborhood. Without personal riding experiences in the mixed road setting, it is not easy for respondents to provide actual opinions in the case of an emerging and innovative transport service. To fill this research gap, this study focuses on the real-world riding experiences of the full automated public bus service operated in Stockholm, Sweden.

Furthermore, personal communication is a promotional marketing strategy to attract new users and retain existing customers (Babic et al., 2016; Harrison-Walker, 2001; Litvin et al., 2008; Trusov et al., 2009). Consumers usually consider others' opinions in order to infer their owns. Thus, a marketing or communicative strategy to promote public transport is necessary. Although some literature addressed the important role of word-of-mouth communication in shaping consumers' behaviours, exploration of the factors influencing users' willingness to recommend the service to others is a topic rarely presented in the public transport literature. To fill this knowledge gap, this study enriches the literature by providing a deep understanding of how such psychological factors influence users' willingness to use the new public transport system and recommend the service to their peers, friends, and family members. This research thus provides a valuable starting point for marketers and policy makers to create new business models and increase the market share of this new public transport mode.

The remainder of this paper is structured as follows. In the next section, we explain the theoretical foundation of the research, and present the conceptual model and hypotheses. Then, we describe the data collection and descriptive statistics. Next, the data analysis and hypotheses testing results are presented. The final section further discusses the main findings, policy implications, and suggests further research directions.

2. Literature review

2.1. Vehicle automation technology acceptance and use

The rapid development of automated vehicles has made great progress and been expected to hold great potential for the development of a future transport system. The potential benefits for vehicle automation technology can only become a reality if the new transport mode are accepted and used by their target users. Recognizing the need for research into the factors influencing the acceptance of the vehicle automation technology, a growing body of behavioural models has been applied.

Madigan et al. (2016) investigated the factors, which might influence acceptance of automated road transport systems vehicles, which were operational in La Rochelle in France and Lausanne in Switzerland. Using the Unified Theory of Acceptance and Use of Technology, the authors indicated that performance expectancy, effort expectancy, and social influence were all useful predictors of behavioural intentions to use automated road transport systems, with performance expectancy having the strongest impact. Similarly, based on an online survey they conducted in the metropolitan area of Austin, Texas, Zmud and Sener (2017) applied the car technology acceptance model to understand how various demographic, behavioural, and psycho-social variables influence acceptance and intent to use automated vehicles. Their study found that psycho-social variables, such as thinking that using self-driving vehicles would be fun and could decrease accident risk, are significant factors in intent to use self-driving vehicles. Leicht et al. (2017) examined the public acceptance of autonomous vehicles in France, and pointed out performance expectancy, effort expectancy and social influence are positively related with purchase intentions of autonomous vehicles. Nordhoff et al. (2018) presented the results of a questionnaire study among individuals who physically experienced an automated shuttle on an office campus in Berlin-Schöneberg. The authors found that positive correlations are observed between shuttle and service characteristics and intention to use, which indicates that quality of service is linked to intentions to use public transport systems.

More recently, Ro and Ha (2019) investigated consumers' intention to adopt autonomous vehicles in Korea, and examined the causal relationship between consumers' expectations, attitudes, and usage intentions. Based on the theory of reasoned action and the unified theory of acceptance and use of technology, their findings indicated that attitudes towards the autonomous vehicles have a significant effect on behaviour intention and technology acceptance. In another example, applying an extended TPB model, Jing et al. (2019) explored the determinants influencing travellers' behavioural intentions towards automated vehicles and shared automated vehicles. Using a valid survey sample collected from 906 respondents in China, the results provided evidence that subjective norm is the most critical factor affecting travellers' intentions to use both automated vehicles and shared automated vehicles.

Previous research has been done to examine individuals' behavioural intention to use the automated vehicles, however, several knowledge gaps remain to be filled. Therefore, in this study we contribute to the previous studies in two ways. First, although existing behavioural models explore how people's behaviour intention is influenced by attitudes and subjective norms, little is known about how potential users' expectations and needs on adoption of the vehicle automation technology. However, travel behaviour is complex. Development of automated public transport mode is still in the early phase. Satisfying users' needs is essential for developing the new bus system. As an extension to previous studies, our research investigates the role of peoples' travel

needs and requirements in technology acceptance. Second, while a growing number of behavioural models explore people's acceptance and adoption of automation technology, most existing studies have contributed based on hypothetical scenarios instead of reflections on actual physical ride experiences. Using such hypothetical scenario-based approaches, it is rather difficult to determine individuals' behaviour intentions as users are not exposed to the real bus service and thus develop different sets of criteria in interacting with automated bus service. To fill this research gap, investigating respondents' actual adoption behaviour in real life situations, this study attempts to examine the determinant factors influencing users' behavioural intention and actual usage of automated buses.

2.2. Word-of-mouth recommendation

It has long been acknowledged that word-of-mouth (WOM) is one of the most powerful marketing tools and influences consumer behaviours. Word of mouth is defined as 'informal, person-to-person communication between a perceived non-commercial communicator and a receiver regarding a brand, a product, an organization or a service' (Arndt, 1967; Harrison-Walker, 2001).

Over the past decades, WOM has been intensively examined in the marketing literature (Bughin et al., 2010; Chatterjee, 2001; De Matos & Rossi, 2008; East et al., 2005; East et al., 2008; Fuentes-Blasco et al., 2017; Gruen et al., 2006; Matzler et al., 2019; Mazzarol et al., 2007; Meuter et al., 2013; Ryu & Park, 2020; Stokes & Lomax, 2002; Tien et al., 2019; Wangenheim & Bayón, 2007; Yeoh et al., 2013; Yoo et al., 2015; Zhang et al., 2017). In the marketing literature, researchers have demonstrated that improvements to particular service attributes are expected to increase users' tendency to recommend a product or a service to others. For example, Hennig-Thurau et al. (2002) found that customer satisfaction has a direct and positive impact on the word-of-mouth communication. Similarly, in an experiment of 484 low-cost airline passengers, Liu and Lee (2016) found that perception of service quality and value is a relevant predictor of WOM behaviour. A positive relationship presented in these studies demonstrated that the higher (lower) the perceived quality, the higher (lower) the WOM activity of the customers.

The expansion of new technologies has increased the importance of WOM (Bickart & Schindler, 2001; Chevailer & Mayzlin, 2006; Mayzlin, 2006; De Bruyn & Lilien, 2008; Dellarocas, 2006; Awad & Ragowsky, 2008; Kozinets et al., 2010; López & Sicilia, 2011; Filieri, 2015; Litvin et al., 2017; Hussain et al., 2018; Zhang et al., 2019). Previous research has demonstrated that as an effective marketing tool for promoting new products or services, positive word-of-mouth communication plays an important role in attracting new users. In travel behaviour research, recent studies have provided empirical results regarding how potential factors influence users' willingness to recommend transport services to others. For example, Taniguchi and Fujii (2007) investigated the persuasive effects of WOM communications. Their findings implied that word-of-mouth communications play an important role in promoting bus service. Using transit satisfaction survey in Montreal, Canada, Diab et al. (2017) developed a logit model to understand the factors affecting passengers' willingness to recommend the transit service to others and their intentions for continued future use. Their findings indicated that users' satisfaction with service, such as satisfaction with their waiting time, travel time, and experience on board increases the odds of promoting the service.

Word of mouth plays an important role in shaping users' behaviours and recommending a certain travel mode to others. Increased automation for public transportation system promises to improve safety, operations and efficiency. However, as this technology is still in its early stages, understanding what factors affect WOM behaviour is a topic rarely presented in the public transport literature. There has been some research on social acceptance and adoption of the new travel mode but limited number of studies has focused on the interpersonal influence of WOM behaviour from both academic and marketing perspectives. To address this knowledge gap, this paper attempts to explore the determinant factors influencing passengers' willingness to recommend the new public travel mode to others by adding new dimension of word-of-mouth communication to the behavioural models.

3. Research hypotheses

The objective of this study is to develop a comprehensive psychological process to understand users' behaviour intention, recommendation intention, and actual usage behaviour of the new bus system. According to the TRA, TPB, and other behavioural models, latent variables, such as favorable attitude, subjective norm, and perceived behavioural control, contribute to the explanatory power of public acceptance of new technologies. TPB is a reformulation of TRA which includes an additional construct called perceived behavioural control that describes as individual's perceptions of his or her capacity to execute a given behaviour (Fishbein, 1997; Notani, 1998). Most existing studies measured public perception and acceptance of this new transport mode based on hypothetical scenarios rather than the collection of actual behavioural data in real-life situations. The participants lacking knowledge or riding experience of this new public transportation system might express much more positive or negative views, and thus cause biased estimates and misleading results (Guo et al., 2020). Thus, focusing on real-life experiences of a real automated bus services, respondents recruited in this study either live or work near the bus route. Instead of examining the perceived capability to use the bus, as a new emerging transport mode, we are more interested to know how needs and expectations of users would influence individuals' intention to use the bus service. Thus, the following research hypotheses are presented.

Individuals' attitude towards a certain behaviour is relevant for behavioural intention. In the context of automated bus system adoption, an individual is assumed to be more willing to adopt the bus system if he/she has an positive attitude towards taking the bus. Accordingly, the relationship between attitude and people's intention to use this new travel mode is hypothesized as:

H1. Attitudes towards the automated bus system positively influence the adoption intention.

Some research focused on understanding the acceptance of new technologies and found that potential new mobility behaviours are influenced by social influences. People's families, relatives, friends, and colleagues shape the attitudes of individuals (Dong et al., 2015; Han et al., 2010; Kolvereid & Isaksen, 2006; Krueger et al., 2000; Maes et al., 2014; Paul et al., 2016). As a result, the encouragement of relatives and friends' or others' recommendation is an important determinant of behaviour intention. For this reason, we propose the following hypothesis:

H2. Social recommendations towards the automated bus system positively influence the adoption intention.

The key to success in adopting a new technology is to satisfy the needs and expectations of users. The process of introducing a new technology is not always smooth. Many significant innovations fail to satisfy user requirements and get abandoned before their launch into the market. Based on this argument, the present study extends the behaviour models by adding users' needs into the framework to better understand individuals' intention to use the bus service. Accordingly, the expected effect on behaviour intention is described in Hypothesis 3:

H3. Travel demands and users' needs positively influence the adoption intention.

As argued by Fishbein and Ajzen (1975), behavioural intention is defined as the most important factor influencing performance of the behaviour. The stronger the intention is in performing a behaviour, the more likely the behaviour will be performed. As argued by Avineri

(2012), although behavioural intention provides a powerful explanation of performance of the behaviour, it can be also argued that some behaviours are perform with little or no pre-planned intent. Behaviour can be seen as impulsive, habitual or emotional rather than planned, and therefore, an 'intention-behaviour gap' might exist. Thus, to explore the relationship between the intention to use such a new transport mode and its actual usage, the following hypothesis is proposed:

H4. Behavioural intention positively influences automated bus system use behaviour.

Understanding travel behaviour and reasons for choosing a certain transport mode over others is an essential issue. Travellers are more likely to use a travel mode serving their travel demands well. With regard to uncovering the direct impact of users' needs on adoption of the new technology, H5 is presented as follows:

H5. Travel demands and users' needs positively influence automated bus system use behaviour.

Promotion through positive word-of-mouth is one of the most powerful forces in the marketplace to attract new users (Bansal et al., 2016). Relying on the theory of reasoned action, the more favorable the attitude towards the behaviour is, the stronger individuals' intention to perform the behaviour will be (Ajzen, 1991). Further, WOM is acknowledged to play a considerable role in influencing and forming consumers' attitudes and behavioural intentions. In turn, good perceptions of the service could impress people and have positive effects on WOM behaviour. Based on this discussion, we propose:

H6. Attitudes towards the automated bus system positively influence word-of-mouth.

Empirical studies have shown that personal communication may play an important role in promoting a new bus system (e.g. Taniguchi & Fujii, 2007). Users usually consider others' opinions in order to infer their own (Bartle et al., 2013). A recommendation to use a new public bus system may make people decide to try the service. Furthermore, as consumers often trust each other, it is reasonable to expect that peers' recommendation is a relevant predictor of word of mouth. New users may in turn recommend the bus to others. We therefore examine the impact of people's recommendation on word-of-mouth behaviours. The hypothesis is summarized as:

H7. Social recommendations towards the automated bus system positively influence word-of-mouth.

Understanding travel behaviour and reasons for choosing one travel mode over another is an essential issue. When introducing a new product or service, it is necessary to consider current and potential users' needs (Abenoza et al., 2019; Chee et al., 2020). Adding travel demands and users' needs into the behaviour model, we hypothesize that satisfying needs and requirements of potential customers plays an important role in the behaviour intention and further recommendation of the product or service to other people. Thus, the following research hypothesis is presented:

H8. Travel demands and users' needs positively influence word-of-mouth.

TRA, TPB, and other behaviour models state that individuals' behavioural intention is believed to process the actual behaviour. Other than that, previous studies revealed that behaviour intention has an effect on WOM. The stronger behaviour intention an individuals has, the higher their recommendation intention is (Tsai and Huang, 2002). However, in the context of automated bus adoption, little effort has been made to explicitly investigate the relationship between users' adoption intention and willingness to recommend the service to others. To address the knowledge gap, we therefore hypothesize that:

H9. Automated bus adoption intention positively influences word-of-mouth.

Based on the above hypotheses, the research framework is depicted in Fig. 1.

4. Methodology and research design

4.1. Study background

The data were collected in Barkarby, Stockholm, Sweden. Barkarby is one of the largest housing development areas in the North Europe. Since October in 2018, electric automated buses have operated in Barkarby and it becomes the largest self-driving project on a mixed traffic environment on the public road in the world. The current maximum speed of electric automated buses is 12–15 km/h; later the speed would reach 18 km/h. The length of the route is 2.5 km, and it is planned that the service route would be doubled in 2020. Currently, there is an operator on-board ready to intervene using a portable control panel if any safety issues arise.

4.2. Research design

This study aims to examine the impacts of attitudes, social recommendations and users' needs on travellers' behaviour intention and recommendation intentions, and further explore the effects of usage intention on actual use behaviour. To examine people's actual adoption behaviour based on passengers' physical ride experiences of autonomous buses, panel data were collected via online questionnaire. The context for the case study and three-wave panel survey are described in detail in Guo et al. (2020). Results of the studies are based on the second and third wave data.

In the second wave survey, respondents answered a series of Likert scale questions related to their attitudes, social recommendations, and travel needs towards the automated buses, and indicated whether they planned to use the automated bus system and willingness to recommend the service to others. Actual behaviour data was collected through the third wave survey.

Questions related to the conceptual framework were measured using 5-point Likert scale items. Attitudes are presumed to be predicted by the likelihood of particular outcomes occurring as a result of performing the behaviour in question (behavioural beliefs) and the evaluations of those outcomes in terms of how good or bad they are believed to be (outcome evaluations) (Francis et al., 2004; Hill et al., 1996; Sparks & Guthrie, 1998). Thus, we design questions that have both 'belief items' and their corresponding 'outcome evaluation' items. To assess attitudes towards the new transport mode, and similar to previous research (e.g., Fu & Juan, 2017; Kerr et al., 2010; Lai & Chen, 2011; Payre et al., 2014), participants were asked four items: (1) 'I think the frequency of an automated bus (AB) is higher than the frequency of normal buses' (2) 'I feel safe when there is an operator/steward on an AB' (3) 'I think automated buses are more reliable than conventional buses.' (4) 'I think or know the current automated bus ride is comfortable'. These items were rated using a five-point Likert scale ranging from 'extremely lower frequency/unsafe/unreliable/uncomfortable' (1) to 'extremely higher frequency/safe/reliable/comfortable' (5). Higher scores indicate more positive attitudes towards the bus service. Similar to previous studies (e.g., Adnan et al., 2017; Fu & Juan, 2017; Paris & Van den Broucke, 2008; Spears et al., 2013), social recommendations were measured with the following three items: (1) 'I intend to use an AB when my family members or friends recommend the service to me' (2) 'I intend to use an AB when a lot of people who are similar to me recommend the service to me', and (3) 'I intend to use an AB when people whose opinion I value recommend the service to me'. To assess travel demands and users' needs, adapted from Milakis (2013), participants were asked by two items: 'AB would be suitable for everyday use', and 'AB would serve the travel needs', questions related to travellers' needs were scored 1–5,

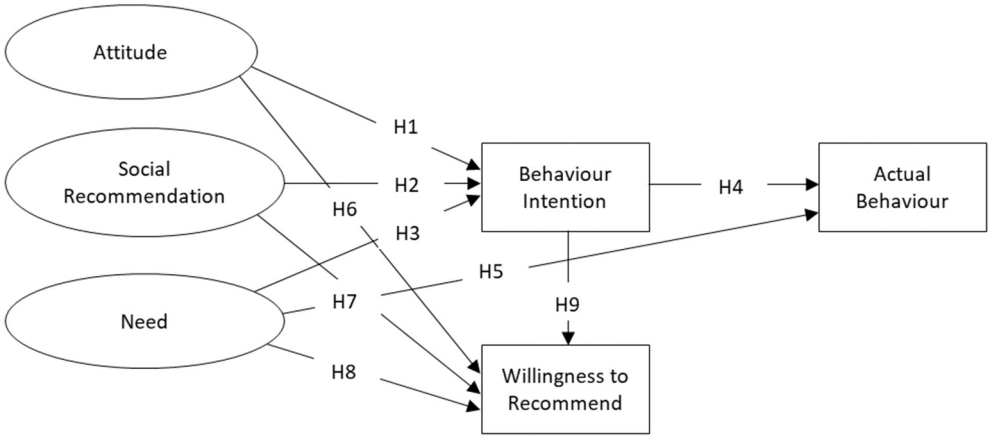

Fig. 1. Conceptual framework.

from very low to very high. Intention to use the AB system was measured by a single item derived from Horvath et al. (2012), Payre et al. (2014), Choi and Ji (2015), and Adnan et al. (2017): 'I intend to take the automated buses in the future'. Willingness to recommend the system to others was assessed by one item 'I intend to recommend the AB system to others'. Lastly, actual use behaviour was assessed in the third wave survey by asking a single item derived from previous research (e.g., Nordfjærn et al., 2014; Zhang et al., 2016): 'How many times have you taken an AB operating along Barkarby?'. Respondents reported the use frequency of AB ride. The measure was limited to the last week in order to reduce the probability that memory bias substantially influenced the responses.

4.3. Data collection and sample description

To understand the long-term changing of individuals' perception, expectation, acceptance and usage towards the operation of autonomous bus service on a public road among old and new residents, three waves of longitudinal data were collected in March, July and December 2019, respectively. A series of psychological (attitudes, preferences and perceptions) questions were collected in all three waves. The panel survey was conducted along the automated bus route in Barkarby. Respondents recruited in this study either live or work near the bus route. The size of the completed sample for all three waves is around 500 individuals, with around 400 individuals recruited for the panel survey, while 100 of them are recruited on each wave. Due to the aim of this study, related research question items were selected from the second and third waves of survey.

The second and third waves' survey consisted of 573 and 497 completed responses, respectively. Among them, a total of 410 participants completed both the second and third wave survey, and thus were used in the analysis. Table 1 shows the demographic characteristics of the sample. As shown in Table 1, 55.6% are females and most respondents are highly educated with 67.4% of them having attained university diplomas and above. Most respondents are aged between 26 and 45 (60.7%) followed by the group aged between 46 and 65 years (21.4%). In addition, 44.8% of the respondents have a mid-level income between 300,000 SEK (about 27,500 EUR) and 700,000 SEK (about 64,000 EUR), while 21.5% denied to provide information about income. Lastly, with regard to the possession of cars, about 74% participants stated they own cars.

Table 1
Descriptive statistics for demographic variables.

Variable	Classification	N	%
Gender	Female	228	55.6
	Male	182	44.4
Age	≤25 years	29	7.1
	26–45 years	249	60.7
	46–65 years	88	21.4
	>65 years	44	10.8
Education	Primary school	12	3.0
	Upper secondary school	121	29.6
	Bachelor degree	63	15.3
	Master degree	208	50.7
	Doctoral degree	6	1.4
Annual income(thousand kronor)	Less than 300	51	12.6
	300–499	99	24.1
	500–699	85	20.7
	700–899	52	12.6
	More than 900	35	8.5
	Do not want to specify	88	21.5
Car ownership	Own a car	304	74.1
	Have no car	106	25.9

5. Analysis and results

Structural equation modeling (SEM) analysis was employed to test whether the survey data fit the conceptual model well and to examine the research hypotheses. The SEM analysis consisted of two procedures. First, a measurement model is estimated using a confirmatory factor analysis (CFA) to assess its adequacy. Second, the path analysis (PA) is used to test the proposed theoretical model.

5.1. Measurement model

Following two-stage analytical procedures, confirmatory factor analysis was conducted to assess the reliability and validity of the measures and examined the structural relationships. Before examining the hypotheses, we removed items with low factor loadings ('I think automated buses are more reliable than conventional buses.'). In the final measurement, all items' factor loadings are greater than 0.6, confirming indicator reliability. The remaining items in the model explained 66.1% of the total variance.

Construct reliability was examined by conducting a reliability test. Cronbach's alphas/Spearman-Brown coefficient values and composite reliability (CR) are two measures to evaluate the construct reliability. Researchers have noted that Cronbach's alpha coefficient is inappropriate for a two-item scale and recommended the use of the Spearman-Brown coefficient (Eisinga et al., 2013). Thus, Spearman-Brown reliability coefficient was used to estimate the reliability of scales consisted of two items, and Cronbach's alpha was used to estimate the reliability of scales composed of more than two items. Table 2 presents the reliability of the internal consistency of the composite scales was adequate with all Cronbach's alphas and Spearman-Brown coefficients above 0.70. As shown in the Table, composite reliability scores were higher than recommended level of 0.70, indicating a quite good reliability.

Table 2
Reliability and validity of the measurement model.

Construct	Items	Factor loading	Cronbach's alpha/ Spearman-Brown coefficient	CR	AVE
Attitude (ATT)	ATT1	0.78	0.83	0.83	0.62
	ATT2	0.86			
	ATT3	0.73			
Social recommendation (SR)	SR1	0.90	0.93	0.91	0.78
	SR2	0.88			
	SR3	0.88			
Need (N)	N1	0.82	0.74	0.74	0.58
	N2	0.71			

5 point Likert scale: 1 = strongly disagree. 5 = strongly agree.

Next, convergent validity and discriminant validity were adopted to assess the validity of the constructs. The convergent validity was tested by average variance extracted (AVE). AVE measures the amount of variance that is captured by the constructs in relation to the amount of variance due to the measurement error. All AVE values exceed the criterion of 0.50, confirming convergent validity. Discriminant validity was evaluated by comparing the square root of AVE values. As illustrated in Table 3, all square roots of AVEs for each construct are greater than the correlations among constructs. Hence, the convergent validity and discriminant validity of this study are verified. Lastly, the variance inflation factors (VIFs) of the constructs are below 5.0, confirming that there is no multicollinearity.

5.2. Structure model and hypotheses test

With an adequate measurement model, path analysis was employed to estimate the path coefficients in this study. The overall goodness-of-fit indices of CFA indicate a satisfactory fit of the measurement model, with chi-square ratio = 2.21, which falls within the recommended range of 1–3. Other fit indices, such as GFI (0.97) and AGFI (0.94) were greater than the recommended value of 0.9, while the root mean square error of approximation (RMSEA) was 0.04, which is less than 0.05. Results represented in Fig. 2 and Table 4 indicate the relationship between different constructs.

This study has applied the behaviour models to examine individuals' intention to adopt the automated bus system. A total of 30.0% of the variance in bus use intention was explained. Some previous studies (e.g., Alessandrini et al., 2014; Madigan et al., 2016; Nazari et al., 2018; Salonen, 2018; Wicki & Bernauer, 2018; Dong et al., 2019) found that favorable attitudes could significantly determine travel behaviour intention; however, interestingly, no statistically significant impact of attitudes on the intention of new travel mode adoption was found in this study.

As another predictor of intention behaviour by social-psychological behavioural models, social recommendation is confirmed to affect users' intention to adopt the automated bus system. The results suggest that humans often orientate their behaviours according to their peer groups, such as friends or family members. In this research context, personal communication may play an important role in promoting such new bus systems. At the early stage of the bus system development, new passengers can be attracted to the bus system by receiving positive comments from others, or even seeing other people taking the bus. This finding is consistent with previous findings. For example, Herrenkind et al. (2019) found that the opinions of ones' family members, friends and colleagues about the automated bus contribute to its acceptance. Nordhoff et al. (2017) also concluded that social influence plays a crucial role in people's use intention. Hence, advertising messages should emphasize the roles of favorable WOM communications to foster favorable image and create positive social recommendations, and in turn to foster bus adoption intentions.

Table 3
Mean, standard deviation, and correlation matrix of constructs.

Construct	Mean	SD	ATT	SN	N
ATT	3.26	1.24	**0.79**		
SN	3.92	0.94	0.26	**0.88**	
N	3.22	1.18	0.36	0.44	**0.76**

Meanwhile, previous literature mainly focused on the influences of attitudes and social recommendations on individuals' intention of the automated system, very few studies have discussed the influence of potential users' needs and requirements on the acceptance of a new technology. To promote a new technology and increase the market share, it is necessary to understand the needs of potential consumers. Focusing on automated vehicle technology applied in the public transport context, the theoretical framework was extended to examine the effects of users' needs and requirements on individuals' intention of the automated bus system. Based on the expanded behaviour model, the results show that meeting users' travel needs have direct influence on use intention, which validates Hypothesis 3. Hence, from the marketing perspective, it is essential to identify how well the new bus service satisfies current and potential users' travel demands.

As indicated above, attitudes, social recommendations, and users' needs are considered as independent variables in the behaviour model. Moreover, according to the theory, behaviour is assumed to be reasoned or planned, and correlated with future activities (Fishbein & Ajzen, 1975). However, individuals' behaviour intention was found to have no significant effect on actual behaviour in this study. The results revealed that planned human behaviour process is complex, and there remains a gap between intention and action. Consumers' actual adoption behaviour may not always be equivalent to adoption intention. To enrich the knowledge of the intention-behaviour gap, further studies are needed to explore how big the gap between intention and behaviour is and understand what external factors can bridge the intention-behaviour gap. By examining the effects of travellers' needs and expectations on adopting this new travel mode, we found that the path coefficients from users' needs to their adoption of the automated bus system were statistically significant and in the expected directions. These results revealed that travel demands and users' needs have a direct relationship with users' actual usage.

In contemporary society, marketers have recognized word-of-mouth communication as an effective marketing strategy to promote a new product or service, and make people decide to have a try. Although word-of-mouth among individuals plays an important role to promote new services, few theoretical frameworks were developed to examine social-psychological factors on individuals' willingness to recommend the automated transport system. Thus, the current study attempts to extend the TRA model by adding a dimension of WOM communications to the theory. As shown in Table 4, attitudes, social recommendations, and travel demands and users' needs all positively influence people's willingness to recommend the bus service to others. Jointly, these three variables explained about 46% of the variance in bus recommendation intention.

More specifically, favorable attitudes towards automated public transport are found to have a slight, but significant, influence on recommending the bus service to others, thus supporting H6. This finding suggests that when individuals have positive perceptions of the service, they are expected to recommend the transport mode to their peers, colleagues, friends, or family members. Furthermore, the results indicated that both social recommendations and travel demands and users' needs help predict behavioural intention to recommend the service, thereby supporting H7 and H8. To assess the relative importance of independent variables, the results showed among these three predictive variables, social recommendations and users' needs all have stronger explanatory powers on word-of-mouth recommendation intention than attitudes based on the magnitude of the standardized coefficients. Accordingly, the results revealed that a recommendation to use a new public bus system may make people decide to use the service, and these

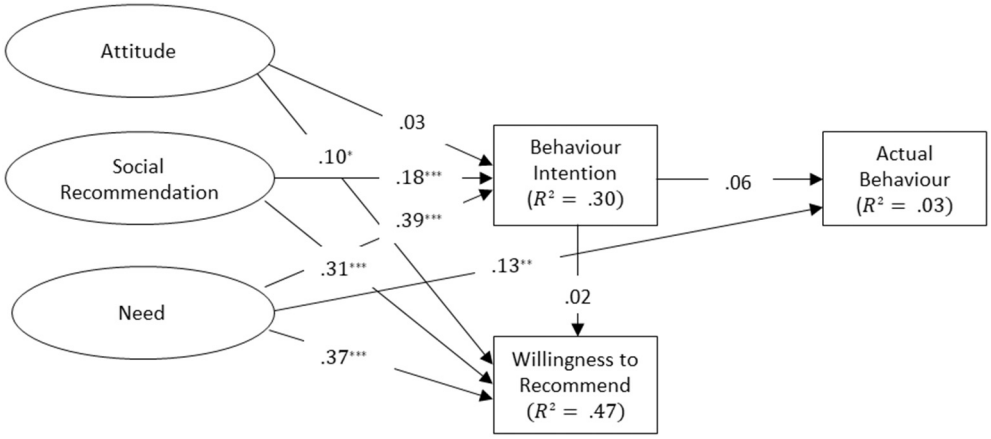

Fig. 2. Research of hypotheses testing (*$p < .05$; **$p < .01$; ***$p < .001$).

Table 4
Common paths effects for the structural equation model (standardized).

Hypothesis	Effect on		Path coefficient	*P*-value	Supported
H1	Attitude	Behaviour intention	0.03	0.55	Not confirmed
H2	Social recommendation	Behaviour intention	0.18	0.01	Confirmed
H3	Need	Behaviour intention	0.39	0.00	Confirmed
H4	Behaviour intention	AB use behaviour	−0.06	0.32	Not confirmed
H5	Need	AB use behaviour	0.13	0.00	Confirmed
H6	Attitude	Word of mouth behaviour	0.10	0.05	Confirmed
H7	Social recommendation	Word of mouth behaviour	0.31	0.00	Confirmed
H8	Needs	Word of mouth behaviour	0.37	0.00	Confirmed
H9	Behaviour intention	Word of mouth behaviour	0.02	0.59	Not confirmed

new users may in turn recommend the bus to others, thus promoting the bus system. Our results also reinforce that serving users' needs of certain travel modes significantly improve recommendation of the service. With this in mind, it has become increasingly important to understand diverse preferences and needs among potential travellers and increase the market share by word of mouth in the long run. Finally, our study found that inviduals' behaviour intention is not correlated with their willingness to recommend the service to others, and thus Hypothesis 9 cannot be confirmed. The results revealed that users who are willing to recommend the service to others are not necessarily the same groups who intend to use the bus system in the future.

6. Discussions and policy implications

Automated vehicles have great potential to have positive impacts on the transportation system. Using TRA, TPB, and other behavioural models, although prior studies have examined users' behaviour intention and actual usage behaviour of the new bus system, to the best of authors' knowledge, most of those studies are based on hypothetical scenarios. Many studies (e.g. Guo et al., 2020; Soteropoulos et al., 2019) question whether the assumptions and approaches of such studies are realistic. To bridge this research gap, based on a revealed observation of a real deployment of the vehicle automation technology, this research helps us to understand the preference and demand of automated bus service in the real world markets much better, and provides a deep understanding for marketers and policy makers to deploy and promote such new public transport mode.

Using a behaviour model, this study investigates the impacts of attitudes and social recommendations on public adoption of the real, fully operated automated public transport service. Some previous studies reported attitude as a strong predictor of behavioural intentions (e.g., Herrenkind et al., 2019). However, in the present study, favorable attitude does not a have an influential impression on users to adopt automated bus. Social recommendation is found to have a positive impact on users' adoption intention as expected. People usually consider other people or early adopters' opinions in order to influence their own. Therefore, as the word-of-mouth recommendation marketing strategy would effectively affect new users constantly entering the system, government and bus companies should pay attention to improve early adopters' evaluation of the bus service.

Furthermore, to successfully promote a new travel mode to the market, it is critically important to understand and satisfy users' travel needs, and thus retain existing passengers, as well as attract new ones from other transport modes. A new theoretical framework was built by adding potential users' needs to the behaviour model. The results showed that satisfying users' travel demands and needs has the strongest effect on adoption intention of the bus service than other social-psychological factors. Our research findings not only make some theoretical contribution to the existing body of literature, but also provide some findings of relevance to government and bus companies. To increase the market share of this new travel mode, further studies are required to address the specific needs of different groups of passengers.

Behaviour intentions measure the strength of individuals' willingness to perform certain behaviours. As argued by Fishbein and Ajzen (1975), behavioural intention is a necessary step in behaviour implementation process. To examine the influence of behavioural intention on actual behaviour, however, most existing studies are based on the cross-sectional data and thus with no data to test the effects on subsequent actual behaviour in the real-world. To fill this research gap, a longitudinal survey was conducted. Using the panel data, intention of using the new public travel mode was not found to significantly lead to actual behaviour. Future studies are needed to explain the intention-action gap.

Lastly, consumer recommendation is one of the most effective marketing tools for promoting a new product or service. Identifying predictors of word-of-mouth behaviours is important to service providers. Our results show that, among three predictors, travel demands and users' needs have the greatest effect on WOM behaviour, while attitudes

have the smallest impact. As such, the more service provision suits passenger's travel needs, the more likely customers are to engage in positive WOM behaviours. Similarly, both positive social recommendations and favorable attitudes were found to significantly lead to positive WOM behaviours. Thus, increasing users' attitudes and perceptions towards the bus service will increase word-of-mouth communication and users' willingness to recommend the service to others. To the best of our knowledge, this is one of the first studies of automated bus adoption and WOM behaviour. This knowledge is important for marketers and bus companies to understand the adoption and recommendation process of this new travel mode better and to design policies and marketing strategies accordingly.

6.1. Limitations and future research

Although this study enriches prior knowledge by providing a deep understanding of how people perceive and adopt automated buses and recommend the new public transport service to others, there are several limitations to this study that could be improved upon in future research.

First, the development of autonomous driving has made great progress and is expected to play an important role in the future transport system. According to behaviour theories, it is important to examine the relationship between attitude and behaviour intention. However, with more riding experiences and knowledge of the new technology, passengers' attitudes towards the bus system will change over time. Thus, longitudinal surveys will be done in the next step to explore whether attitude changes would influence adoption and actual use of the bus.

Second, this study found that the encouragement of relatives, friends or others' recommendation has an effect on the intention to use and word of mouth behaviour of the new bus mode. According to the original formulation of the behaviour models, such as TRA and TPB, subjective norm is measured as a predictor of behaviour intentions. It would be interesting and generalizable to test the proposed model in this research by considering subjective norm as a determinant of the intention to use the automated buses. Future comparative studies would make a worthwhile contribution to the body of knowledge.

Third, the findings clearly show that suiting travellers' needs has large impact on bus use intention and WOM behaviour. Accordingly, to understand the motivation or purpose to use an automated bus is a requisite for serving travellers' mobility needs and developing corresponding business models. As an extension to the current study, it would be important in future research to identify travellers' motivation to take the bus.

Fourth, this study was part of larger research project. Therefore, only a limited number of questions were included in the survey to capture the behavioural intentions of using the automated buses and recommending the new bus service to other people in the future. However, a single item may be vulnerable to unknown biases in meaning and interpretation. As a result, it might limit its reliability and effectiveness of measuring individuals' decision to use automated bus services and the word of mouth behaviours. Therefore, multiple-item measurement of behavioural intentions can be applied in future studies to increase the validity and reliability.

Fifth, relationship between satisfaction and future behavioural intentions has been well addressed in the satisfaction literature. Travellers' satisfaction or dissatisfaction with their prior travel experiences is considered critical because it may affect decisions they made in their future travel plans and willingness to recommend the transport mode to others. For example, as argued by Wang and Hsu (2010), travellers who perceived satisfied riding experience are more likely to have positive word-of-mouth behaviours. The quality of automated bus service will be improved with the development the technology, which in turn creates more positive evaluations and higher satisfaction with the service, and thus may have direct and positive effects on positive behavioural intentions and word-of-mouth communication. In future research, we should attempt to consider satisfaction as one of the determinants to predict behaviour intention.

Finally, previous studies reported that behaviour intention is positively associated with actual behaviour. However, similar results are not found in this study, which suggests an intention-behaviour gap. For future research it would be interesting to conduct in-depth interviews to explore the influencing factors to improve the intention-behaviour gap and increase users' actual adoption behaviour of this new public transport mode.

CRediT authorship contribution statement

Jia Guo: Conceptualization, Data curation, Investigation, Methodology, Writing – original draft, Writing – review & editing. **Yusak Susilo:** Conceptualization, Data curation, Investigation, Methodology, Writing – review & editing. **Constantinos Antoniou:** Methodology, Writing – review & editing. **Anna Pernestål:** Funding acquisition, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

Abe, R. (2019). Introducing autonomous buses and taxis: Quantifying the potential benefits in japanese transportation systems. *Transportation Research Part A, 126*, 94–113.

Abenoza, R. F., Cats, O., & Susilo, Y. O. (2019). Determinants of traveler satisfaction: Evidence for non-linear and asymmetric effects. *Transportation Research Part F, 66*, 339–356.

Adnan, N., Nordin, S., Rahman, I., & Rasli, A. (2017). A new era of sustainable transport: An experimental examination on forecasting adoption behavior of EVs among malaysian consumer. *Transportation Research Part A, 103*, 279–295.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*, 179–211.

Alessandrini, A., Alfonsi, R., Delle Site, P., & Stam, D. (2014). Users' preferences towards automated road public transport: Results from european surveys. *Transportation Research Procedia, 3*, 139–144.

Arndt, J. (1967). Role of product related conversations in the diffusion of a new product. *Journal of Marketing Research, 4*, 291–295.

Avineri, E. (2012). On the use and potential of behavioural economics from the perspective of transport and climate change. *Journal of Transport Geography, 24*, 512–521.

Awad, N., & Ragowsky, A. (2008). Establishing Trust in Electronic Commerce through Online Word of mouth: An examination across genders. Journal of management information systems. *Journal of Management Information Systems, 24*, 101–121.

Babic, A., Sotgiu, F., de Valck, K., & Bijmolt, T. H. A. (2016). The effect of electronic word of mouth on sales: A meta-analytic review of platform, product, and metric factors. *Journal of Marketing Research, 53*, 297–318.

Bamberg, S., Fujii, S., Friman, M., & Gärling, T. (2011). Behaviour theory and soft transport policy measures. *Transport Policy, 18*(1), 228–235.

Bansal, P., Kockelman, K. M., & Singh, A. (2016). Assessing public opinions of and interest in new vehicle technologies: An Austin perspective. *Transportation Research Part C, 67*, 1–14.

Bartle, C., Avineri, E., & Chatterjee, K. (2013). Online information-sharing: A qualitative analysis of community, trust and social influence amongst commuter cyclists in the UK. *Transportation Research Part F, 16*, 60–72.

Bickart, B., & Schindler, R. M. (2001). Internet Forums as Influential Source of Consumer Information. *J. Interact. Mark., 15*, 31–39.

Bosch, P. M., Ciari, F., & Axhausen, K. (2016). Autonomous vehicle Fleet sizes required to serve different levels of demand. *Transportation Research Record, 2542*, 111–119.

Bughin, J., Doogan, J., & Vetvik, O. J. A. (2010). New way to measure word-of-mouth marketing. *McKinsey Quarterly, 2*, 113–116.

Cao, Z., & Ceder, A. (2019). Autonomous shuttle bus service timetabling and vehicle scheduling using skip-stop tactic. *Transportation Research Part C, 102*, 370–395.

Chatterjee, P. (2001). Online reviews: Do consumers use Them? *Advances in Consumer Research, 28*, 129–133.

Chee, P., Susilo, Y., & Wong, Y. (2020). Determinants of intention-to-use first-/last-mile automated bus service. *Transportation Research Part A, 139*, 350–375.

Chen, C. (2019). Factors affecting the decision to use autonomous shuttle services: Evidence from a scooter-dominant urban context. *Transportation Research F, 67*, 195–204.

Chen, D. T., Kockelman, K., & Hanna, J. P. (2016). Operations of a shared, autonomous, electric vehicle Fleet: Implications of vehicle and charging infrastructure decisions. *Transportation Research Part A, 94*, 243–254.

Chevailer, J. A., & Mayzlin, D. (2006). The effect of word of mouth on sales: Online book reviews. *Journal of Marketing Research, 43*, 345–354.

Choi, J., & Ji, Y. (2015). Investigating the importance of trust on adopting an autonomous vehicle. *International Journal of Human-Computer Interaction, 31*, 692–702.

De Bruyn, A., & Lilien, G. L. (2008). A multi-stage model of word-of-mouth influence of viral marketing. *International Journal of Research in Marketing, 25*, 151–163.

De Matos, C. A., & Rossi, C. A. V. (2008). Word-of-mouth Communications in Marketing: A meta-analytic review of the antecedents and moderators. *Journal of the Academy of Marketing Science, 36*, 578–596.

Dellarocas, C. (2006). Strategic manipulation of internet opinion forums: Implications for consumers and firms. *Management Science, 52*, 1577–1593.

Diab, E., van Lierop, D., & Ei-Geneidy, A. (2017). Recommending transit: Disentangling users' willingness to recommend transit and their intended continued use. *Travel Behavour and Society, 6*, 1–9.

Dong, X., DiScenna, M., & Guerra, E. (2019). Transit user perceptions of driverless buses. *Transportation, 46*, 35–50.

Dong, Z., Schmöcker, J.-D., Fujii, S., & Yang, X. (2015). Social norms and public transport usage: Empirical study from Shanghai. *Transportation, 43*, 869–888.

East, R., Hammond, K., & Lomax, W. (2008). Measuring the impact of positive and negative word of mouth on brand purchase probability. *International Journal of Research in Marketing, 25*, 215–224.

East, R., Hammond, K., Lomax, W., & Robinson, H. (2005). What is the effect of a Recommendation? *The Marketing Review, 5*, 145–157.

Eisinga, R., Grotenhuis, M., & Pelzer, B. (2013). The reliability of a two-item scale: Pearson, cronbach, or spearman-Brown? *International Journal of Public Health, 58*, 637–642.

Fagnant, D., & Kockelman, K. (2014). The travel and environmental implications of shared autonomous vehicles, using agent-based model scenarios. *Transportation Research Part C, 40*, 1–13.

Fagnant, D., & Kockelman, K. (2015). Preparing a nation for autonomous vehicles: Opportunities, barriers and policy recommendations. *Transportation Research Part A, 77*, 167–181.

Filieri, R. (2015). Why do travelers trust TripAdvisor? Antecedents of trust towards consumer-generated media and its influence on recommendation adoption and word of mouth. *Tourism Management, 51*, 174–185.

Fishbein, M. (1997). Predicting, Understanding, and Changing Socially Relevant Behaviors: Lessons learned. In C. McGarty, & S. A. Haslam (Eds.), *The message of social psychology* (pp. 77–91). Oxford: Blackwell.

Fishbein, M., & Ajzen, I. (1975). *Beliefs, attitude, intention and behavior: An introduction to theory and research*. Reading: Addison-Wesley.

Fraedrich, E., Heinrichs, D., Bahamonde-Birke, F. J., & Cyganski, R. (2018). Autonomous driving, the built environment and policy implications. *Transportation Research Part A, 77*, 162–172.

Francis, J., Eccles, M. P., Johnston, M., Walker, A. E., Grimshaw, J. M., Foy, R., Kaner, E. F. S., Smith, L., & Bonetti, D. (2004). *Constructing questionnaires based on the theory of planned behaviour: A manual for health services researchers*. Newcastle upon Tyne, UK: Centre for Health Services Research, University of Newcastle upon Tyne.

Fu, X., & Juan, Z. (2017). Understanding public transit use behavior: Integration of the theory of planned behavior and the customer satisfaction theory. *Transportation, 44*, 1021–1042.

Fuentes-Blasco, M., Moliner-Velázquez, B., Servera-Francés, D., & Gil-Saura, I. (2017). Role of marketing and technological innovation on store equity, satisfaction and word-of-mouth in retailing. *Journal of Product & Brand Management, 26*, 650–666.

González-González, E., Nogués, S., & Stead, D. (2019). Automated vehicles and the city of tomorrow: A backcasting approach. *Cities, 94*, 153–160.

Gruen, T. W., Osmonbekov, T., & Czaplewski, A. J. (2006). eWOM: The impact of customer-to-customer online know-how exchange on customer value and loyalty. *Journal of Business Research, 59*, 449–456.

Guo, J., Susilo, Y., Antoniou, C., & Pernestål Brenden, A. (2020). Influence of individual perceptions on the decision to adopt automated bus services. *Sustainability, 12*, 6484.

Han, H., Hsu, L., & Sheu, C. (2010). Application of the theory of planned behavior to green hotel choice: Testing the effect of environmental friendly activities. *Tourism Management, 31*, 325–334.

Haque, A. M., & Brakewood, C. (2020). A synthesis and comparison of american automated shuttle pilot projects. *Case Studies on Transport Policy, 8*, 928–937.

Harrison-Walker, L. J. (2001). The measurement of word-of-mouth communications and an investigation of service quality and customer commitment as potential antecedents. *Journal of Service Research, 4*, 207–215.

Hennig-Thurau, T., Gwinner, K., & Gremler, D. (2002). Understanding relationship marketing outcomes: An integration of relational benefits and relationship quality. *Journal of Service Research, 4*, 230–247.

Herrenkind, B., Brendel, A., Nastjuk, I., Greve, M., & Kolbe, L. (2019). Investigating end-user acceptance of autonomous electric buses to accelerate diffusion. *Transportation Research Part D, 74*, 255–276.

Hill, M., Mann, L., & Wearing, A. J. (1996). The effects of attitude, subjective norm and self-efficacy on intention to benchmark: A comparison between managers with experience and no experience in benchmarking. *Journal of Organizational Behavior, 17*, 313–327.

Horvath, C., Lewis, I., & Watson, B. (2012). Peer passenger identity and passenger pressure on young drivers' speeding intentions. *Transportation Research Part F, 15*, 52–64.

Hussain, S., Wang, G., Jafar, R., Ilyas, Z., Mustafa, J., & Yang, J. (2018). Consumers' online information adoption behavior: Motives and antecedents of electronic word of mouth communications. *Computers in Human Behavior, 80*, 22–32.

Jamson, A., Merat, N., Carsten, O., & Lai, F. (2013). Behavioural changes in drivers experiencing highly-automated vehicle control in varying traffic conditions. *Transportation Research Part C, 30*, 116–125.

Jing, P., Huang, H., Ran, B., Zhan, F., & Shi, Y. (2019). Exploring the factors affecting mode choice intention of autonomous vehicle based on an extended theory of planned behavior-a case study in China. *Sustainability, 11*, 1155.

Kerr, A., Lennon, A., & Watson, B. (2010). The call of the road: Factors predicting students' car travelling intentions and behaviour. *Transportation, 37*, 1–13.

Kolvereid, L., & Isaksen, E. (2006). New business start-up and subsequent entry into self-employment. *Journal of Business Venturing, 21*, 866–885.

Kozinets, R. V., De Valck, K., Wojnicki, A. C., & Wilner, S. J. S. (2010). Networked narratives: Understanding word-of-mouth marketing in online communities. *Journal of Marketing, 74*, 71–89.

Krueger, N., Reilly, M., & Carsrud, A. (2000). Competing models of entrepreneurial intentions. *Journal of Business Venturing, 15*, 411–432.

Lai, W., & Chen, C. (2011). Behavioral intentions of public transit passengers-the roles of service quality, perceived value, satisfaction and involvement. *Transport Policy, 18*, 318–325.

Lee, D., & Hess, J. (2020). Regulations for on-road testing of connected and automated vehicles: Assessing the potential for global safety harmonization. *Transportation Research Part A, 136*, 85–98.

Leicht, T., Chtourou, A., & Youssef, K. (2017). Consumer innovativeness and intentioned autonomous car adoption. *The Journal of High Technology Management Research, 29* (1).

Litvin, S., Goldsmith, R., & Pan, B. (2008). Electronic word-of-mouth in hospitality and tourism management. *Tourism Management, 29*, 458–468.

Litvin, S., Goldsmith, R., & Pan, B. (2017). A retrospective view of electronic word-of-mouth in hospitality and tourism management. *International Journal of Contemporary Hospitality Management, 30*, 313–325.

Liu, C., & Lee, T. (2016). Service quality and Price perception of service: Influence on word-of-mouth and revisit intention. *Journal of Air Transport Management, 52*, 42–54.

López, M., & Sicilia, M. (2011). How WOM marketing contributes to new product adoption testing competitive communication strategies. *European Journal of Marketing, 47*, 1089–1114.

Lutin, J. M., & Kornhauser, A. L. (2014). Application of autonomous driving technology to transit-functional capabilities for safety and capacity. *Transportation Research Record*, 14–0207.

Madigan, R., Louw, T., Dziennus, M., Graindorge, T., Ortega, E., Graindorge, M., & Merat, N. (2016). Acceptance of automated road transport systems (ARTS): An adaptation of the UTAUT model. *Transportation Research Procedia, 14*, 2217–2226.

Maes, J., Leroy, H., & Sels, L. (2014). Gender differences in entrepreneurial intentions: A TPB multi-group analysis at factor and indicator level. *European Management Journal, 32*, 784–794.

Matzler, K., Teichmann, K., Strobl, A., & Partel, M. (2019). The effect of Price on word of mouth: First time versus heavy repeat visitors. *Tourism Management, 70*, 453–459.

Mayzlin, D. (2006). Promotional chat on the internet. *Marketing Science, 25*, 155–163.

Mazzarol, T., Sweeney, J. C., & Soutar, G. N. (2007). Conceptualizing word-of-mouth activity, triggers and conditions: An exploratory study. *European Journal of Marketing, 41*, 1475–1494.

Meuter, M., McCabe, D., & Curran, J. (2013). Electronic word-of-mouth versus interpersonal word-of-mouth: Are all forms of word-of-mouth equally influential? *Services Marketing Quarterly, 34*, 240–256.

Milakis, D. (2013). Will greeks Cycle? Exploring intention and attitudes in the case of the new bicycle network of Patras. *International Journal of Sustainable Transportation, 9*, 321–334.

Milakis, D., van Arem, B., & van Wee, B. (2017). Policy and society related implications of automated driving: A review of literature and directions for future research. *Journal of Intelligent Transportation Systems, 21*, 324–348.

Narayanan, S., Chaniotakis, E., & Antoniou, C. (2020). Shared autonomous vehicle services: A comprehensive review. *Transportation Research Part C, 111*, 255–293.

Nazari, F., Noruzoliaee, M., & Mohammadian, A. (2018). Shared versus private mobility: Modeling public interest in autonomous vehicles accounting for latent attitudes. *Transportation Research Part C, 97*, 456–477.

Nordfjærn, T., Simsekoglu, Ö., & Rundmo, T. (2014). The role of deliberate planning, car habit and resistance to change in public transportation mode use. *Transportation Research Part F, 27*, 90–98.

Nordhoff, S., de Winter, J., Madigan, R., Merat, N., van Arem, B., & Happee, R. (2018). User acceptance of automated shuttles in Berlin-Schöneberg: A questionnaire study. *Transportation Research Part F, 58*, 843–854.

Nordhoff, S., van Arema, B., Merat, N., Madiganc, R., Ruhrort, L., Knieb, A., & Happeea, R. (2017). User acceptance of driverless shuttles running in an open and mixed traffic environment. In *Proceedings of the 12th ITS European Congress, Strasbourg, France* (pp. 19–22).

Notani, A. S. (1998). Moderators of perceived behavioral control's predictiveness in the theory of planned behavior: A meta-analysis. *Journal of Consumer Psychology, 3*, 247–272.

Olia, A., Razavi, S., Abdulhai, B., & Abdelgawad, H. (2018). Traffic capacity implications of automated vehicles mixed with regular vehicles. *Journal of Intelligent Transportation Systems, 22*, 244–262.

Paris, H., & Van den Broucke, S. (2008). Measuring cognitive determinants of speeding: An application of the theory of planned behaviour. *Transportation Research Part F, 11*, 168–180.

Paul, J., Modi, M., & Patel, J. (2016). Predicting green product consumption using theory of planned behavior and reasoned action. *Journal of Retailing and Consumer Services, 29*, 123–134.

Payre, W., Cestac, J., & Delhomme, P. (2014). Intention to use a fully automated car: Attitudes and a priori acceptability. *Transportation Research Part F, 27*, 252–263.
Piao, J., McDonald, M., Hounsell, N., Graindorge, M., Graindorge, T., & Malhene, N. (2016). Public views towards implementation of automated vehicles in urban areas. *Transportation Research Procedia, 14*, 2168–2177.
Ro, Y., & Ha, Y. (2019). A factor analysis of consumer expectations for autonomous cars. *Journal of Computer Information Systems, 59*, 52–60.
Ryu, S., & Park, J. (2020). The effects of benefit-driven commitment on usage of social media for shopping and positive word-of-mouth. *Journal of Retailing and Consumer Services, 55*.
Salonen, A. (2018). Passenger's subjective traffic safety, in-vehicle security and emergency management in the driverless shuttle bus in Finland. *Transport Policy, 61*, 106–110.
Simonia, M., Kockelman, K., Gurumurthy, K., & Bischoff, J. (2019). Congestion pricing in a world of self-driving vehicles: An analysis of different strategies in alternative future scenarios. *Transportation Research Part C, 98*, 167–185.
Soteropoulos, A., Berger, M., & Ciari, F. (2019). Impacts of automated vehicles on travel behaviour and land use: An international review of modelling studies. *Transport Reviews, 39*, 29–49.
Sparks, P., & Guthrie, C. A. (1998). Self-identity and the theory of planned behaviour: A useful addition or an unhelpful Artifice? *Journal of Applied Social Psychology, 28*, 1393–1410.
Spears, S., Houston, D., & Boarnet, M. (2013). Illuminating the unseen in transit use: A framework for examining the effect of attitudes and perceptions on travel behavior. *Transportation Research Part A, 58*, 40–53.
Stokes, D., & Lomax, W. (2002). Taking control of word-of-mouth marketing: The case of an entrepreneurial hotelier. *Journal of Small Business and Enterprise Development, 9*, 349–357.
Strathman, J., Kimpel, T., Dueker, K., Gerhart, R., & Callas, S. (2002). Evaluation of transit operations: Data applications of tri-Met's automated bus dispatching system. *Transportation, 29*, 321–345.
Talebpour, A., & Mahmassani, H. S. (2016). Influence of connected and autonomous vehicles on traffic flow stability and throughput. *Transportation Research Part C, 71*, 143–163.
Taniguchi, A., & Fujii, S. (2007). Promoting public transport using marketing techniques in mobility management and verifying their quantitative effects. *Transportation, 34*, 37–49.
Tien, D., Rivas, A., & Liao, Y. (2019). Examining the influence of customer-to-customer electronic word-of-mouth on purchase intention in social networking sites. *Asia Pacific Management Review, 24*, 238–249.
Tirachini, A., & Antoniou, C. (2020). The economics of automated public transport: Effects on operator cost, travel time, fare and subsidy. *Research in Transportation Economics, 21*, Article 100151.
Trusov, M., Bucklin, R. E., & Pauwels, K. (2009). Effects of word-of-mouth versus traditional marketing: Findings from an internet social networking site. *Journal of Marketing, 73*, 90–102.
Tsai, W.-C., & Huang, Y.-M. (2002). Mechanisms linking employee affective delivery and customer behavioral intentions. *Journal of Applied Psychology, 87*(5), 1001–1008.
Wadud, Z., MacKenzie, D., & Leiby, P. (2016). Help or Hindrance? The travel, energy and carbon impacts of highly automated vehicles. *Transportation Research Part A, 86*, 1–18.
Wang, C., & Hsu, M. K. (2010). The relationships of destination image, satisfaction and behavioral intentions: An integrated model. *Journal of Travel & Tourism Marketing, 27*(8), 829–843.
Wangenheim, F., & Bayón, T. (2007). The chain from customer satisfaction via word-of-mouth referrals to new customer acquisition. *Journal of the Academy of Marketing Science, 35*, 233–249.
Wicki, M., & Bernauer, T. (2018). Public opinion on route 12 interim report on the first survey on the pilot experiment of an automated bus Service in Neuhausen am rheinfall. *Technical Report, ISTP Paper Series, 3*. https://doi.org/10.3929/ethz-b-000282577
Winter, K., Wien, J., Molin, E., Cats, O., Morsink, P., & van Arem, B. (2019). Taking the self-driving bus: A passenger choice experiment. In *6th international conference on models and technologies for intelligent transportation systems (MT-ITS)*.
Yeoh, E., Othman, K., & Ahmad, H. (2013). Understanding medical tourists: Word-of-mouth and viral marketing as potent marketing tools. *Tourism Management, 34*, 196–201.
Yoo, C., Kim, Y., & Sanders, G. (2015). The impact of interactivity of electronic word of mouth systems and E-quality on decision support in the context of the E-marketplace. *Information & Management, 52*, 496–505.
Zachariah, J., Gao, J., Kornhauser, A., & Mufti, T. (2014). Uncongested mobility for all: A proposal for an area wide autonomous taxi system in New Jersey. In *In 93rd Annual Meeting of the Transportation Research Board*.
Zhang, D., Schmöcker, J., Fujii, S., & Yang, X. (2016). Social norms and public transport usage: Empirical study from Shanghai. *Transportation, 43*, 869–888.
Zhang, M., Hu, M., Guo, L., & Liu, W. (2017). Understanding relationships among customer experience, engagement, and word-of-mouth intention on online brand communities: The perspective of service ecosystem. *Internal Research, 27*, 839–857.
Zhang, S., Li, Y., Liu, C., & Ruan, W. (2019). Critical factors in the identification of word-of mouth enhanced with travel apps: The moderating roles of confucian culture and the switching cost view. *Asia Pacific Journal of Tourism Research, 24*, 422–442.
Zumd, J., & Sener, I. (2017). Towards an understanding of the travel behavior impact of autonomous vehicles. *Transportation Research Procedia, 25*, 2500–2519.