Consumer Willingness to Pay for Autonomous Vehicles in Japan

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1 ABSTRACT

In recent years, autonomous vehicle (AV) technology is expected to play an important role in the construction of next-generation, efficient and sustainable urban transport systems by integrating with electric vehicle (EV) technology. In Japan, in particular, the spread of autonomous vehicle technology is attracting a great deal of attention as a means of solving social issues such as traffic congestion, environmental impact in urban areas, and the shortage of drivers due to the declining birthrate and aging population. On the other hand, in order to promote the spread of automated vehicles, it is essential to create a social and institutional environment that takes into account not only technological progress but also consumer acceptance and willingness to pay (WTP). In particular, in the Japanese market, it is not yet fully clear how unique consumer characteristics such as strong expectations of safety, a cautious attitude towards new technology, high price sensitivity, and strong trust in domestic manufacturers affect acceptance of automated vehicles and WTP. In this paper, we review previous research from Japan and overseas, and focus on the Japanese market in particular, to organize and consider the factors that determine people's acceptance of and willingness to pay for (WTP) autonomous vehicles. Furthermore, we present hypotheses for future empirical analysis from the perspectives of politics, economics, society, culture, and technology acceptance, and aim to provide insights that will contribute to the development of the foundations for AV acceptance research in Japan by presenting future research issues and an analytical framework.

Keywords: Autonomous Vehicles (AV), Consumer Acceptance, Willingness to Pay (WTP), Social and Cultural Factors, Japan

2 INTRODCTION

In recent years, autonomous vehicle (AV) technology has been attracting attention as an important element supporting the next-generation sustainable transportation system through technological integration with electric vehicle (EV) technology (Todorovic, et al., 2017). In particular, Japan faces a number of social issues, such as chronic traffic congestion, environmental impact in urban areas, and a shortage of labor due to the declining birthrate and aging population, and the social implementation of autonomous driving technology has the potential to contribute significantly to solving these issues (Japan Research Center for Transport Policy, 2020).

On the other hand, in order for autonomous vehicles to become widespread, it is essential to not only focus on the technological aspects, but also to create a social and institutional environment that takes into account consumer acceptance and willingness to pay (WTP). In particular, in the Japanese market, it is difficult to say that sufficient knowledge has been accumulated on how consumer attitudes such as strong expectations of safety, a cautious attitude towards new technology, brand orientation and price sensitivity will affect the acceptance of automated driving technology. Furthermore, the direction of government regulations and policies, as well as structural changes in the automobile industry as a whole, are also thought to have a complex impact on the spread of AVs.

In this paper, we will review existing research on the factors that determine the acceptance of autonomous vehicles, and consider them in the context of the Japanese market, particularly from the perspectives of politics, economics, society, culture, and technology acceptance. In addition, we will present a framework for the empirical approach and data collection needed to test these hypotheses, and suggest future research directions.

3 LITERATURE REVIEW

3.1 Acceptance of automated vehicles (AVs) and willingness to pay (WTP)

Many international surveys have been conducted to date on attitudes towards and willingness to pay (WTP) for automated vehicles (AVs), mainly in Europe and the United States. According to existing research, consumers generally tend to have positive attitudes towards AVs, and expectations of improved safety,

particularly collision avoidance functions, are a factor that increases acceptance (Shin et al., 2015; Du et al., 2021).

In terms of AV acceptance, technology trust is an important determinant, and the higher the trust in the technology, the higher the acceptance and WTP (Xu et al., 2018; Liu et al., 2019). In addition, it has been confirmed that the benefits that consumers perceive in AVs have a stronger impact on acceptance than risk perception (Liu et al., 2019).

On the other hand, there are large differences in WTP depending on the country and market characteristics. For example, according to Ellis et al. (2016), the average WTP in the United States was reported to be $6,903, but in Japan it was only around 400,000 to 800,000 yen, showing a relatively low trend (Jiang et al., 2019; Shin and Managi, 2017; Morita and Managi, 2020).

Factors that affect acceptance and WTP include media influence (Du et al., 2021), perceived ease of use (Jiang et al., 2021), and demographic characteristics such as age and gender (Ellis et al., 2016). These factors interact with each other to shape acceptance patterns in each country.

3.2 Acceptance of AVs in the Japanese market

While existing research has accumulated a wealth of knowledge on acceptance factors and WTP determinants, particularly in Europe and the United States, there is still a lack of comprehensive analysis of cultural and policy factors specific to the Japanese market (Shin and Managi, 2017). In particular, there is a limited amount of systematic empirical research on the extent to which factors such as Japan's unique culture of safety and security(Taniguchi et al., 2022; Asia Business Law Journal, 2024), trust in domestic manufacturers(Tamaki and Managi, 2018; Chikaraishi et al., 2020), and mobility needs in an aging society(Taniguchi et al., 2022) affect acceptance of and WTP for automated vehicles.

Furthermore, since the traffic conditions and reliance on modes of transport differ greatly between urban and rural areas even within Japan, detailed analysis that takes regional differences into account is also required. In addition, there is a need for empirical investigation into how unique Japanese consumer psychology, such as price sensitivity and a tendency to follow the crowd (Ogura,2024), affects the acceptance process for new technologies such as automated vehicles.

In these proceedings, based on the above review of previous research, we will present hypotheses for a multifaceted examination of consumer acceptance of and willingness to pay (WTP) for automated vehicles, with a focus on factors specific to the Japanese market, with the aim of laying the groundwork for future empirical analysis.

4 HYPOTHESES

In this chapter, based on a review of previous research, we will present hypotheses that should be focused on in examining the main factors that determine the acceptance of and willingness to pay for (WTP) automated vehicles (AVs) in the Japanese market. In particular, we will extract hypotheses that are essential for future empirical analysis from three categories: attribute factors, external factors, and factors specific to Japan, and organize them as follows.

First, with regard to attribute factors, we will focus on age and interest in new technology (Wang et al.2020; Kaye et al., 2021 ;Taniguchi et al.,2022). Existing research has shown that younger people are more receptive to new technology and have a higher WTP. In particular, while younger people in Japan have high expectations for automated vehicles, older people may have mixed expectations for convenience and concerns about safety. In addition, people who are highly interested in new technology are also thought to have a positive attitude towards automated vehicles.

Next, we will look at external factors such as trust in technology and safety concerns (Asgari & Jin, 2019; Rahimi et al., 2020; Liu et al.,2019; Choi and Ji., 2015; Ellis et al., 2016). Trust in automated driving technology is an important factor that directly affects acceptance and WTP. In Japan, there is a strong tendency to prioritize safety and security above all else, and concerns about safety are thought to have a significant impact on acceptance and WTP. Therefore, the key to popularization is to increase trust in the technology and at the same time, to reduce concerns about the risk of accidents and system failures.

In addition, we will focus on Japan-specific factors such as trust in domestic manufacturers and price sensitivity(Morita and Managi 2020; Shin & Managi, 2017). Japanese consumers traditionally have a high

level of trust in domestic manufacturers, and it is predicted that WTP for AV products made by domestic manufacturers will be higher than for those made by overseas manufacturers. In addition, in the Japanese market, where price sensitivity is high, the impact of policy support such as subsidies and tax incentives on WTP cannot be ignored. In addition, the "herd mentality", in which the opinions of others and usage conditions influence individual decisions, is also thought to play an important role in the diffusion process.

The above hypotheses will form the basis for future empirical research to examine AV acceptance and WTP in the Japanese market from a variety of perspectives. In this paper, we will present an analytical framework that takes into account the unique social and cultural background of Japan through these hypotheses, and indicate the direction for future research.

5 CONCLUSION

In this paper, we review previous studies on consumer acceptance of and willingness to pay for (WTP) automated vehicles (AVs) in Japan and overseas, and present hypotheses focusing on cultural and social factors specific to the Japanese market.

The review of previous studies confirmed that concerns about safety and trust in technology are important factors that affect consumer acceptance and WTP, and that these are common factors internationally. On the other hand, in the Japanese market, it was suggested that unique factors such as trust in domestic manufacturers, the needs specific to an aging society, a culture of safety and security, and a sense of conformity are likely to be significantly involved in the acceptance process of AVs.

The hypotheses presented in this paper can be positioned as a theoretical foundation for understanding the structure of AV acceptance and WTP in the Japanese market from multiple perspectives. In the future, we plan to clarify the determinants of WTP in the Japanese market by collecting and analyzing empirical data from consumer questionnaire surveys based on the hypotheses presented in this paper.

Ultimately, we aim to provide policy implications and insights that will contribute to the formulation of market strategies by automobile manufacturers, as well as to contribute to the development of the foundations of AV acceptance research in Japan.

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