

Shared Versus Pooled Automated Vehicles: Exploring Behavioral Intentions Towards On-Demand Automated Vehicles

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Abstract : Automated vehicles (AVs) are emerging technologies that could potentially offer a wide range of opportunities and challenges for the transportation sector. The advent of AV technology has also resulted in new business models in shared mobility services where many ride hailing and car sharing companies are developing on-demand AVs including shared automated vehicles (SAVs) and pooled automated vehicles (Pooled AVs). SAVs and Pooled AVs could provide alternative shared mobility services which encourage sustainable transport systems, mitigate traffic congestion, and reduce automobile dependency. However, the success of on-demand AVs in addressing major transportation policy issues depends on whether and how the public adopts them as regular travel modes. To identify conditions under which individuals may adopt on-demand AVs, previous studies have applied human behavior and technology acceptance theories, where Theory of Planned Behavior (TPB) has been validated and is among the most tested in on-demand AV research. In this respect, this study has three objectives: (a) to propose and validate a theoretical model for behavioral intention to use SAVs and Pooled AVs by extending the original TPB model; (b) to identify the characteristics of early adopters of SAVs, who prefer to have a shorter and private ride, versus prospective users of Pooled AVs, who choose more affordable but longer and shared trips; and (c) to investigate Canadians' intentions to adopt on-demand AVs for regular trips. Toward this end, this study uses data from an online survey (n = 3,622) of workers or adult students (18 to 75 years old) conducted in October and November 2021 for six major Canadian metropolitan areas: Toronto, Vancouver, Ottawa, Montreal, Calgary, and Hamilton. To accomplish the goals of this study, a base bivariate ordered probit model, in which both SAV and Pooled AV adoptions are estimated as ordered dependent variables, alongside a full structural equation modeling (SEM) system are estimated. The findings of this study indicate that affective motivations such as attitude towards AV technology, perceived privacy, and subjective norms, matter more than sociodemographic and travel behavior characteristic in adopting on-demand AVs. Also, the results of second objective provide evidence that although there are a few affective motivations, such as subjective norms and having ample knowledge, that are common between early adopters of SAVs and PooledAVs, many examined motivations differ among SAV and Pooled AV adoption factors. In other words, motivations influencing intention to use on-demand AVs differ among the service types. Likewise, depending on the types of on-demand AVs, the sociodemographic characteristics of early adopters differ significantly. In general, findings paint a complex picture with respect to the application of constructs from common technology adoption models to the study of on-demand AVs. Findings from the final objective suggest that policymakers, planners, the vehicle and technology industries, and the public at large should moderate their expectations that on-demand AVs may suddenly transform the entire transportation sector. Instead, this study suggests that SAVs and Pooled AVs (when they entire the Canadian market) are likely to be adopted as supplementary mobility tools rather than substitutions for current travel modes

Keywords : automated vehicles, Canadian perception, theory of planned behavior, on-demand AVs

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