Charting a sustainable course: how normative factors shape intentions for Autonomous Rapid Transit commuting

Nur Zaimah Ubaidillah
Faculty of Economics and Business, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, Malaysia,
unzaimah@unimas.my

Fatin Nur Hidayah Taib Khan
Faculty of Economics and Business, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, Malaysia,
tkfnhidayah@unimas.my (corresponding author)

Siti Nur Fatin Morshidi
Faculty of Economics and Business, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, Malaysia,
sitifatinm@gmail.com

Farhana Ismail
Faculty of Economics and Business, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, Malaysia,
ifarhana@unimas.my

Nurul Izza Abd. Malek
Faculty of Economics and Business, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, Malaysia,
amnizza@unimas.my

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Abstract: With the continuous advancement of technology, transportation methods have undergone significant transformation, giving rise to innovative solutions like Autonomous Rapid Transit (ART). ART systems are designed to utilize hydrogen energy, serving as an efficient and eco-friendly power source. This not only addresses issues related to traffic congestion but also presents a promising solution to environmental challenges. However, the success of implementing such technologies to mitigate these challenges relies heavily on the support and acceptance of potential users. This study aims to explore the intention of users to adopt ART as a mode of transportation in the context of Sibu, Sarawak, Malaysia. This study conducted a comprehensive survey involving 350 respondents and employed Partial Least Squares Structural Equation Modelling (PLS-SEM) to analyse the data. The findings of this study reveal that several critical factors significantly influence the behavioural intention to use ART for commuting. Specifically, subjective norms, perceived behavioural control, and individual attitudes have a significant impact on the intention to embrace ART as a sustainable mode of transportation. However, the study also finds that personal norms do not exhibit a significant relationship with behavioural intention. This insight underscores the pivotal role of societal influences compared to individually internalized values in shaping user decision-making with regard to the adoption of ART for commuting. It is imperative for policymakers to take into account the perspectives and considerations of users when formulating policies related to the introduction and promotion of new public transportation modes where private transportation has traditionally been prevalent.

1   Introduction

The rising economic growth worldwide has led to a tremendous increase in the need to travel and has changed how societies commute. Generally, greater travel needs lead to greater demand for transport. In developed Asian countries, the reliance on private transport coincides with the usage of public transport such as trains, trams, and public buses as well as non-motorized transport (NMT) like walking and cycling. This is contrary to many developing Asian countries, where the main mode of transport relies heavily on private vehicles such as cars and motorcycles. Statistically, there is a high level of vehicle ownership in developing countries (e.g., Malaysia: 542 motor vehicles per 1000 inhabitants; Brunei: 614 motor vehicles per 1000 inhabitants). Furthermore, there is a substantial growth in the level of car ownership, rising by approximately 64% from 2010 to 2021. High traffic flow indirectly contributes to environmental problems, including CO_2 emissions and air pollution [1]. According to [2], the transport sector is the third-highest contributor of CO_2 emissions (24.5%) in Malaysia, behind manufacturing and construction (35.1%) and electricity and heat production (29.3%). To solve these problems, urban road resources need to be redistributed, and a diverse, three-dimensional, and modern public transportation system needs to be established. The implementation of such measures is expected to mitigate the environmental impact of traffic congestion and promote sustainable transportation alternatives.