

学位論文の要旨 (論文の内容の要旨)
Summary of the Dissertation (Summary of Dissertation Contents)

論 文 題 目

Dissertation title: **A Multiple-Case Study Exploring Risk Perceptions and Social Acceptability of**

Autonomous Vehicles: Japan to Israel

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With the growing popularity of autonomous vehicle (AV) technology, the global automotive industry has engaged in an extremely rapid and sustained research and development process with the aim of creating reliable self-driving cars for everyday use. AVs have the potential to bring numerous social and economic benefits, including shorter travel times and reduced environmental impact. These benefits will only increase as the technology advances over the coming years. However, the successful implementation of AVs at a large scale depends on public acceptance and understanding. Efforts to improve public acceptance and convey accurate information to the public depend on first assessing where opinion currently lies.

This dissertation presents a multi-nation comparative study of public acceptance of AVs with a primary focus on Japan. As of 2022, current Japanese law allows for self-driving vehicles operating at levels 1-3 of autonomous self-control, as described in the classification scheme developed by SAE International (formerly the Society of Automotive Engineers). Level 3 AVs have “environmental detection” capabilities and can make informed decisions for themselves; current commercial vehicles are already equipped with functions up to this level. But more advanced alternatives are imminent, with the government aiming to achieve public use of level 4 AVs by 2025. These vehicles go beyond level 3 capabilities in several ways, the most critical of which is that they can intervene if things go wrong or there is a system failure. They will therefore not require human control in most circumstances, although a human operator will retain the ability to override the system manually. The change from level 3 to level 4 AVs thus has two components. One is technological, with more advanced self-regulating systems required to implement level 4 vehicles, but the other is social. Human drivers and pedestrians must accept the new systems and must trust AVs to act correctly and safely when facing mechanical failure, dangerous driving conditions, and collisions. For the government’s goal of implementing level 4 AVs to move forward, general public risk tolerance for these vehicles must exceed a minimal level of acceptance. However, studies evaluating the risk perception and general acceptance of AV technology remain limited, and do not provide sufficient information to determine whether this minimal level has been reached. There are five research questions we seek to address across the projects:

1. What are the key barriers to AV introduction in terms of public attitudes and opinions?
2. What role does information and knowledge play in risk perceptions toward AVs in the context of the BUS/LRT integration experiment?
3. What factors affect risk perception for AVs, and why do these matter in solving existing challenges around developing AV technologies and increasing public acceptance of them?
4. Why are the Japanese risk-averse and non-accepting toward AVs (including historical, cultural, and educational context)?
5. Why are Israelis more willing to take risks and more accepting toward AVs (including historical, cultural, and educational context)?

Motivated by the rapid development of AV technology and a lack of robust, reliable evidence concerning public acceptance of the risks these technologies pose, we analyzed risk perception and public acceptance of AV's in Japan to Israel using theoretical framework originating from the work of Paul Slovic and his colleagues. This study contributes to the literature in a significant way, as it is the first experimental evaluation of individual's risk perceptions toward AV technologies, potentially allowing for future experimental work on the effectiveness of marketing and nudging strategies for changing perceptions. We further assessed how risk perception changes both within the same population over time, before and after several major public demonstrations of integrated AV use, and between two culturally distinct national populations. This final section of the chapter will describe the content of each subsequent chapter and highlight the connections between them.

This dissertation consists of five chapters. Chapter One presents an introduction to all three research projects, providing the background and explaining the significance of the problem that is explored. It details the logical and methodological links between the three papers on risk perception and public acceptance of autonomous vehicles, including relevant concepts and the core theoretical framework.

In Chapter Two, the first of three papers present the results of a study on risk perception and social acceptability of autonomous vehicles in Hiroshima, Japan. The paper reports an experiment that was conducted in 2017 assessing the risk type (dread or unfamiliarity) and specific AV-related risk factors (system error, hacking, unexpected events) as influences on risk perception and public acceptance.

In Chapter Three, the second article explores temporal changes in risk perception and public acceptability of autonomous vehicles between 2017 and 2020, using the same population reported on in Chapter Two. This study was motivated by the need to assess any potential changes in public opinion resulting from two well-publicized AV demonstrations that took place in 2018 and 2019.

In Chapter Four, the third and final article assesses differences in risk perception and public acceptance of AVs between groups of participants located in Japan and Israel, to better understand how cultural variation might affect attitudes toward AVs, risk, and considerations for large-scale implementation of these technologies.

Finally, in Chapter Five we summarize the primary findings and implications from all three component studies, discuss the project's limitations, and engage with policy implications and directions for future research. Taken together, research that we need to establish a clearer understanding of the perceived benefits and risks of AVs before the technology is implemented at scale within our communities. That knowledge will also contribute to the wider field of technology acceptance and allow future researchers to gain greater insight into risk perception and public attitudes toward other new technologies. From a practical perspective, the present study may provide useful insights for policymakers developing regulations for AVs and manufacturers working on making AVs safer from external system threats.

These multiple studies reported here also have a number of policy implications, specifically related to the testing of AVs for public use. Foremost among these is a message for manufacturers: ordinary people consider system security to be a primary area of risk, and future development and marketing should strive to allay these concerns. The studies also demonstrate that risk perception and social acceptance.

備考 論文の要旨はA 4判用紙を使用し、4,000字以内とする。ただし、英文の場合は1,500語以内とする。

Remark: The summary of the dissertation should be written on A4-size pages and should not exceed 4,000 Japanese characters. When written in English, it should not exceed 1,500 words.