DEVELOPMENT OF MANAGENMENT STRATEGY THROUGH ANALYSIS OF ADOPTION INTENTION AND INFLUENCE FACTORS OF AUTONOMOUS VEHICLES : CENTERING ON VALUE-BASED ADOPTION MODELS

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ABSTRACT

DEVELOPMENT OF MANAGENMENT STRATEGY THROUGH ANALYSIS OF ADOPTION INTENTION AND INFLUENCE FACTORS OF AUTONOMOUS VEHICLES : CENTERING ON VALUE-BASED ADOPTION MODELS

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This study was conducted to derive business strategies to help commercialize and popularize autonomous vehicles by exploring and demonstrating factors that affect the value and acceptance of autonomous vehicles perceived by potential buyers and future users of autonomous vehicles, one of the state-of-the-art new technologies of the Fourth Industrial Revolution. Under the consciousness and goals of these problems, this study verified the effects of 'perceived benefits', 'perceived sacrifice', 'perceived bias,' and 'the perceived threat' on 'perceived value' and 'adoption intent' through a survey and statistical analysis of general users, referring to the 'value-based adoption model', a representative analytic theory of users' perceived value for new technology, intent of acceptance, and intent for continued use.

To this end, the study conducted a survey of 602 users interested in autonomous vehicles, and the collected survey data was conducted using the SPSS States 21.0 package program to analyze the frequency of demographic characteristics, analysis of technical statistics of sub-factors and detailed metrics that make up independent and dependent variables, analysis of validity and reliability, and simple and multiple

regression between independent and dependent variables. The results of the analysis and verification of this study are summarized as follows.

By demonstrating in various ways that individual users' perceived benefits and optimistic prejudices against autonomous vehicles have a positive impact on perceived value and adoption intention, while perceived sacrifices and perceived threats have negative effects, this study derived and suggested a user-centered business strategy that can be applied and applied as necessary for the commercialization and popularization of autonomous vehicles. It is hoped that the results and conclusions of this study will be used as valid theoretical and practical guidelines and basic references to help the mid- to long-term development of autonomous vehicles.

Key words : autonomous vehicle, value-based adoption model, perceived benefit, perceived sacrifice, optimistic bias, perceived threat, perceived value, adoption intention

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INTRODUCTION

1.1 Introduction

As the Fourth Industrial Revolution emerges as a trend in the near future or ongoing core technology, the proper utilization, commercialization and popularization of various high-tech new technologies organizing and leading the fourth industrial revolution such as artificial intelligence, big data, clouding services, Internet of Things, 3D printers, autonomous vehicles, and drones are emerging as global challenges (Oh Young-seung, 2019). The key new technologies that constitute the Fourth Industrial Revolution focus on overcoming the limitations of time and space, the essence of the analog age, to redefine the concept of space and distance, the physical background of human activity, and to reconstruct and innovate the environment, space, and resources that have a profound impact on the quality of individual and public life (Kim In-sook, Nam Yu-sun, 2016). The development and commercialization of efficient and convenient advanced transportation that can bring innovation in the urban environment and the daily lives of urban residents is also a representative area and detailed theme of the new technology of the future. Among them, the autonomous vehicle is a key item that focuses the interest and expectations of the current general users, and is a key item that related companies are focused on as a business strategy to lead the future (IRS Global, 2019).

The autonomous vehicle, which refers to a car that runs on its own without the control of a driver, is an item that not only global automobile manufacturers but also a number of IT-related companies are fiercely competing for development and commercialization, which is expected to be commercialized as early as 2022 to 2023 (IRS Global, 2020). Google, which is currently the leader in the field of autonomous-

driving technology, is pursuing a 100% autonomous vehicles that completely exclude driver operation or control, and is seeking to differentiate itself from other competitors. Many experts are skeptical about whether fully autonomous self-drivinjg cars will be possible (Schulz, Thomas, 2016). Whether unmanned or manned, many experts agree that the issue of safety-related systems should be preceded for the commercialization and popularization of autonomous vehicles (Kim Gyu-ok, 2020).

1.2 Research Problem

Unlike ordinary cars, autonomous vehicles can drive automatically through a precise driving system in the body without the driver having to control or control the steering wheel, brakes, pedals, analyze and grasp the surrounding environment and situation through various sensors attached to the body, or choose the optimal driving route to the destination while avoiding obstacles (Ulrich, 2019). For this, it is essential to develop and commercialize various autonomous driving technologies and related systems, including road driving support systems, vehicle positioning and route recognition systems, lane departure warning systems, lane maintenance support systems, rear and side alarm systems, advanced smart cruise controls that maintain constant distance between vehicles, automatic emergency braking systems, and inter-vehicle collision avoidance systems (Min Kyung-deuk, 2014).

Google, which is currently at the forefront of the competition of autonomous-driving technology, is consistently pursuing the development of a 'autonomous vehicle' that completely excludes driver control or intervention. The autonomous vehicle, also known as 'Google Car', drives itself by acquiring and collecting information about the surrounding environment through video cameras, direction indicators, artificial intelligence software, and GPS (Whitein, 2017). The rider, a sensor device mounted on

the roof of Google's autonomous vehicle, consists of 64 remote lasers, sonar equipment, and 3D cameras, and the autonomous vehicle generates a 3D map of the surrounding environment to measure the distance between objects and detect danger. The Google autonomous vehicle succeeded in driving safely 200,000 miles (320,000 1,000 kilometers) in 2012 and 700,000 miles (1.12 million 6,000 kilometers) in 2014 (Schulz, Thomas, 2016). Inspired by this achievement, Google has set 2018 as the first commercialization point for autonomous vehicles. Contrary to Google's initial expectations or plans, the commercialization of 100% autonomous vehicles, as well as the commercialization of the compromised autonomous vehicles, in which the driver partially intervenes and makes a final decision, has yet to be achieved as of 2021.

Most automakers, except Google, are focusing on the development of conditional and compromised autonomous-driving technologies that require the management and judgment of drivers (Baek Seo-in, 2017). Considering that the computer system in the body may be suddenly shut down or hacked, or considering the sudden obstacles on the road, partially incorrect indication of the road on the map, sudden changes due to accidents, construction, etc., it will be difficult to completely exclude driver management or intervention at any time during the operation of the vehicle. Thus, there are many experts and general users who believe that the conditional and compromised autonomous vehicles are realistically feasible (Myung Do Hyun, 2019).

Not to mention unmanned autonomous vehicles, as there are still many technical obstacles to the implementation and mass production of conditional and compromised manned autonomous vehicles, the commercialization and popularization of autonomous vehicles is expected to take more time (Yang Eun-ji et al. 2017). In addition, there are many experts and general users who are skeptical about the safety and efficiency of autonomous vehicles. Therefore, for related companies, not only will they focus on the

development and commercialization of autonomous vehicles, but also autonomous vehicles that have been developed and released in the market will lead to trust and positive response from general users, and it is necessary to establish appropriate marketing and business strategies to induce stable use-and-purchase intentions and use-and-purchase behaviors. If a autonomous vehicle developed at a huge cost reveals problems in safety and utility, and is distrusted and neglected by users, the meaning of the development of the technology will not be found at all.

As well as the technical and industrial development of autonomous vehicles, drawing positive response, evaluation, and trust from users is also necessary and important for the bright future of autonomous vehicles. Considering this fact, this study aims to investigate the general user's perception of autonomous vehicles, one of the core technologies of future society, and to analyze through an empirical study the factors that affect the intention and behavior of users to accommodate, purchase, and utilize autonomous vehicles. Previous studies related to autonomous vehicles have mainly focused on technical and industrial analysis. On the other hand, it is hard to analyze the general users' perception of autonomous vehicles, attitude, adoption acceptance, and motivation for purchase. It has been in recent years that the results of research on autonomous vehicles have begun to be produced, and since autonomous vehicles are not yet clearly commercialized or popularized, the need to analyze the users' perceptions and attitudes toward autonomous vehicles has not been highlighted, and there has been little analysis and research on users' perception, attitude, and intention to accept autonomous vehicles.

1.3 Purpose of Research

Considering this situation, the study aims to provide theoretical and practical guidelines for the dissemination and proliferation of autonomous vehicles in preparation for the upcoming commercialization and popularization of autonomous vehicles by analyzing the factors that affect users' perception and adoption of autonomous vehicles. In order to address the consciousness of this problem more logically and scientifically, the study seeks to refer to and utilize the Value-based Adoption Model, which is considered an appropriate tool for analyzing the perceived value and usability of general users for advanced new technologies, intent of acceptance, and motivation for use.

The value-based adoption model is a model proposed to analyze the perceived impact of benefit and sacrifice on new technologies, and is considered a balanced analysis model that takes into account both positive and negative factors such as perceived benefit and perceived sacrifice on new technologies (Kim, Chan, Gupta, 2007). Using this analysis model as a theoretical reference, this study aims to analyze and demonstrate the perceived benefits of autonomous vehicles of general users (positive factors) and the impact of perceived sacrifices (negative factors) on perceived values and adoption intentions through empirical surveys (questionnaire surveys) to build useful guidelines and basic references to actively cope with and prepare for the era of commercialization of self-drving cars in the near future.

On the other hand, variables affecting perceived value and acceptance of advanced new technologies can be considered in addition to the two variables (perceived benefits and perceived sacrifices) presented in value-based adoption models. In this regard, this study will focus on the recent increasing use of optimistic bias in the areas of safety thinking, information security, and health. Optimistic bias refers to the tendency of many people to make unrealistic and irrationally optimistic predictions or predictions about the likelihood of situations or events yet to occur (Choi Jong-gun, Chae Myung-

shin, 2010). In particular, many people vaguely hope that the negative consequences of future events or accidents are at least less likely than others, and, on the contrary, refers to the unfounded attitude or psychology that expects it to occur more frequently (Weinstein, Klein, 1994), and is also referred to as unrealistic optimism (Weinstein, 1980) and self-favoring bias. Optimistic or self-favoring prejudices are explained to have different consequences by having a significant impact on many people's behavior or will, and people are influenced by this structural bias and tend to interpret vague information or uncertain situations in their favor (Choi Jong-keun, Chae Myung-shin, 2016).

By linking it to autonomous vehicles, a number of current experts and users, who are optimistic about safety concerns and malfunctions of the system, will be able to be optimistic while paying attention to the positive consequences of autonomous vehicles. Therefore, those with a strong optimistic bias are expected to determine the use and purchase of autonomous vehicles much easier and faster than those who are negative or cautious when autonomous vehicles are released. However, while there is a difference in degree of optimism bias, this is a psychology inherent to most people, so it may induce and promote the use or purchase of autonomous vehicles by stimulating or amplifying the potential optimism bias of general users. In this sense, it is also meaningful to empirically analyze the impact of the general users' optimistic prejudice on the perceived value and adoption intention of autonomous-driving vehicles. This study seeks to select and utilize optimism bias as the third independent variable, along with the two variables, the perceived benefits and perceived sacrifice, presented in the value-based adoption model.

On the other hand, this is a variable that runs counter to optimism bias, and it is to be keenly aware of the potential threat of an unsolved situation or event, potential vulnerability or seriousness, and consider the tendency or attitude to more sensitively predict and prepare for possible threats, risks, or negative consequences. Along with the

optimistic tendency of interpreting and judging surrounding situations or events in their favor, people also need to pay full attention to these psychology and attitudes that are more carefully and sensitively aware of unknown situations or potential threats of events, as they also have a defensive motivation to protect themselves from possible threats or dangers (Jang Han-jin, Noh Ki-young, 2020). This is called perceived threat, which refers to the psychology or attitude to act as cautious, conservative, and defensive as possible while interpreting vague information, uncertain situations, and events against oneself and predicting negative consequences, contrary to optimistic prejudice (Park Jung-sook, 2016).

This perceived threat, contrary to optimistic bias, is expected to affect the use or purchase of autonomous vehicles by raising awareness of the safety of the autonomous vehicles and malfunction of the system more seriously. As with optimistic bias, there is a difference in the degree of perceived threats, but this is a psychology inherent to most people (Moon Ji-hyo, Lee Jong-won, 2020), which could facilitate the acceptance and purchase of autonomous vehicles by reducing or eliminating the perceived threats of the average users. To this extent, this study seeks to demonstrate the impact of perceived threats on the perceived value and adoption intention of autonomous vehicles by selecting perceived threats as the fourth independent variable, along with perceived benefits, perceived sacrifice, and optimism bias. Through the selection and design of such variables as above, this study aims to establish theoretical and practical guidelines and references to help commercialize and popularize autonomous vehicles by fair and balanced analyzing variables that affect the perceived value and acceptance of autonomous vehicles, one of the advanced new technologies of the future, by dividing them into positive aspects (perceived benefits and optimistic bias) and negative aspects (perceived sacrifices and perceived threats).

CHAPTER II:

REVIEW OF LITERATURE

2.1 Theoretical Framework

Chapter II will carry out theoretical and literature-considered work on key concepts, topics, and key measurement and analysis items that will constitute and lead this study. Theoretical and literary considerations deepen the methodology of this study and lay the academic basis and foundation for the establishment of research models and hypotheses, which is an important fundamental task for deriving measurement tools with reliability and validity. Under this purpose, we will consider autonomous vehicles in 2.2, value-based adoption model in 2.3, optimistic bias in Section 2.4, and perceived threats in 2.5, respectively.

2.2 Autonomous vehicle

2.2.1 Meaning of autonomous vehicle

With the commercialization and popularization of autonomous vehicles, one of the cutting-edge new technologies that will lead the fourth industrial revolution, approaching the near future, countries around the world are presenting a formal definition of autonomous vehicles through the enactment and revision of related laws. First of all, in Korea, it refers to a "vehicle that can operate on its own without the operation, control, and management of drivers or passengers,”according to Article 2 subparagraph 1-3 of the Automobile Management Act published on August 11, 2015 (Lee Sung-hee, 2020).

In the U.S., the core technology of autonomous vehicles was defined as “authonomous technology that has the capability to drive a vehicle without the active physical control or monitoring by a human operator.”In addition, cars equipped with such

autonomous-driving technology were defined as “autonomous vehicles” (Any vehicle equipped with autonomous technology that has been integrated into that vehicle).

With comprehensive reference to the above legal definitions of South Korea and the U.S., a autonomous vehicle can be defined as a "vehicle that can drive safely on its own "by appropriately planning, modifying, and changing the route for driving by recognizing the environment for driving only with the built-in system in the body and judging risks or obstacles, without direct operation or control by a driver. In the process for the operation of the autonomous vehicle, instead of the human driver's vision and hearing, the system related to the automatic sensor detects and reads the surrounding environment and situation to determine the route for driving, and uses its own power to drive independently, not only by avoiding sudden obstacles, but also by accurately adjusting the distance from the car in front and behind (Yoon Hyun Jung, 2018).

The concept of autonomous-driving was conceived around Mercedes-Benz in the 1960s, and the development of rudimentary research began in the mid-to-late 1970s (Eliot, 2018). In the early days, it was at the level of experimenting with limited autonomous-driving without crossing the center line or lane on flat and safe test roads without any obstacles, but as the field of computational processing and judgment technology has developed dramatically since the 1990s, advanced autonomous-driving technology has begun to begin to recognize and analyze obstacles and solve them properly (Ulrich, 2019).

In Korea, full-fledged development and research on autonomous-driving began in the late 1990s, centering on the National Transportation Research Institute and the Korea University Research Institute. In the early 2000s, it succeeded in developing technologies to enable smooth autonomous-driving for a long period of time on the free road between Goyang-si City and Paju-si City, Gyeonggi-do Province (Yangjusang, 2019). The system

of technology at the time was developed by the Korea Transport Institute, which was not able to operate any route as freely as the current autonomous-driving system, which was enough to travel between sections, prescribed access roads, and access roads. Despite these limitations, this is considered an important achievement that marks a milestone in the development of Korea's autonomous-driving technology, and as a result, active development of technology has been carried out so far. In order to reliably implement the technology system of the time, two computers were installed in the car, one of which was responsible for controlling driving by collecting and interpreting information about the traffic environment, while the other was provided with driving-related information to control the movement of the vehicle. As research on autonomous-driving technology using deep learning advances from 2010, the performance of autonomous vehicles is also improving rapidly, and if these achievements continue to accumulate, about 75% of the world's vehicles are expected to be converted to autonomous vehicles by 2040 at the latest (Neupane, Sunita, 2019).

2.2.2 Classification of autonomous vehicles by Stages of Technology

Considering the speed and growth of autonomous-driving vehicles, Society of Automotive Engineers announced in 2014 by dividing the level of autonomous vehicles' automation technology into five stages (Level 0~Level 4). National Highway Traffic Safety Administration, a subsidiary of the U.S.-based Department of Transportation, announced that it will officially employ it in the enforcement process of Federal Automated Vehicles Policy in October 2016, adding the existing SAE Phase 5, Level 5, to Level 6 (Level 0 ~ Level 5), which is more likely to be used as an international standard for the classification of the world's autonomous vehicles in the future (Lee Joon-

young, Lee Kyung-soo, 2015). The levels of automation of autonomous vehicles officially defined by SAE and NHTSA are as shown in Table 2.1.

Table 2. 1
Criteria for classification by stages of autonomous-driving

Level	Name	Classification Criteria
Level 0	No Automation	The stage in xxwhich the driver must control the car completely manually.
Level 1	Driver Assistance	The stage where the driver is assisted by the most basic driving assistance system, such as emergency stop and speed driving.
Level 2	Partial Automation	A step assisted by partial autonomous-driving systems in vehicle and lane recognition when driving on the highway, and maintaining the distance from the car ahead.
Level 3	Conditional Automation	Autonomous driving in a certain section (short distance). The driver keeps an eye on the surroundings to prepare for unexpected situations.
Level 4	High Automation	All safety controls and autonomous-driving are possible under certain road conditions.
Level 5	Full Automation	A fully automated step that allows all functions to reach the destination without the driver's intervention.

First of all, Level 0 is a common vehicle that does not include any system or details related to autonomous-driving. Next, Level 1 refers to a rudimentary autonomous-driving stage with the most basic driving assist, such as an automatic emergency stop and

speed driving device. Even now, features such as lane departure alarms and cruise control supported by some cars fall into this stage.

Although the driver is still the main driver of driving in Level 2, this means the partial application of autonomous-driving systems in vehicle and lane recognition when driving on the highway and maintaining the distance from the car in front of them. This stage is an integrated active control stage that integrates existing autonomous-driving technologies like Tesla's Autopilot. The driver's eyes must face forward, but he or she shall not have to use the steering wheel and pedals.

Level 3 is the stage that allows only a autonomous-driving system to operate a certain section equivalent to a relatively short distance on the premise of a flat and safe road without obstacles and a well-maintained environment. During this section, the driver leaves the car to the system without manipulating it, but must be prepared for an unexpected situation while keeping an eye on the surrounding situation. Although Level 3 is a limited section, it is a "limited autonomous-driving stage" in which driver intervention or control is required only in certain situations (emergency circumstances) as the vehicle recognizes the traffic signal and flow of the road, and the autonomous vehicles currently being developed by Waymo LLC belong to this stage.

Level 4 refers to a very high level of autonomous-driving in which a autonomous-driving system is responsible for and controls almost every part of driving in the situation of a particular road, such as an optimized road separately built for autonomous-driving. In Level 4, there is no need for the driver intervention in most situations, but it is recommended that the driver boards the vehicle in case of an emergency. In Korea, Nexo, a hydrogen cell vehicle manufactured by Hyundai Motor, succeeded in completing the 190km Seoul-Pyeongchang highway from Seoul to Pyeongchang-gun in February 2018 with only the autonomous-driving system (Lim Hae-joong, 2018) While implementing

Level 4 has been a great success, this step has the realistic limitation that it is possible only on dedicated roads built specifically for autonomous-driving and cannot guarantee success on regular roads. While overcoming these limitations, multinational companies are currently making investment and effort to enable full autonomous-driving on general roads.

Level 5 is a stage in which complete autonomous-driving 'with no driver intervention' is implemented under any circumstances and under any conditions. The phase initially defined by SAE did not have Level 5, but as NHTSA added Level 5, the "Stage of Dream Automation" in October 2016, the current autonomous-driving technology is divided into six stages. Unlike other companies regarding autonomous-driving, Google is working on the development and production of autonomous vehicles aimed at implementing Level 5. Currently, it is Level 5 that presents the most questions and skepticism regarding the safety of autonomous vehicles, and depending on the researchers, it is impossible to fully implement Level 5. Ordinary users are also expected to feel considerable anxiety while not having full confidence in Level 5 autonomous vehicles. With this in mind, the study aims to examine the perceived benefits of autonomous vehicles, including Level 5, perceived sacrifices, optimism bias (for safety accidents), and perceived threats, and to analyze and verify the perceived value of the autonomous vehicles and their impact on their intention to accept them.

2.2.3 Market Outlook for autonomous vehicles

In the early 2000s, companies related to global autonomous vehicles selected 2020 as the time for commercialization of autonomous vehicles, and market research institutes predicted that the global market for autonomous vehicles will be formed in earnest from the 2020s. However, as of the first half of 2021, the commercialization of

autonomous vehicles has not yet been realized, which is expected to be delayed in a few years. In the mid-2010s, Boston Consulting Group predicted that the global market for autonomous vehicles will grow to about $42 billion (about 50 trillion won) by 2025 and $77 billion (about 90 trillion won) by 2035 (Carrier, 2018) It also predicts that by 2035, 25 percent of the world's sales will be autonomous vehicles, with 12 million fully autonomous vehicles and 18 million partial autonomous vehicles.

By comparison, IHS Auto Motive predicts that global sales of autonomous vehicles will surpass 1,000 units in 2035, accounting for about 10% of the global auto market (Lee Jae-gwan, 2018). It shows a wide gap from the aforementioned Boston Consulting Group's forecast of a total of 30 million units of fully autonomous vehicles and partial autonomous vehicles. Integrated Market Research (2018) expects the global autonomous vehicle market to grow to $54.2 billion 3,000 in 2019 and $556.6 billion 7,000 in 2026, recording an average annual growth rate of 39.47%, which is already partially wrong.

As the commercialization of autonomous vehicles continues to slow, the outlook for the size of the global market will become less accurate, but if autonomous vehicles are commercialized in the near future, the global market will grow rapidly, and the fact that this will change the automobile industry and transportation policy paradigm will remain unchanged. Taking this into consideration, factors that affect the psychological intention or behavior of general users to select or use autonomous vehicles will be analyzed, and business strategies will need to be sought to effectively enhance the interest and interest in autonomous vehicles of general users, who are future potential buyers, in preparation for the commercialization and popularization of autonomous vehicles in the near future. Under the consciousness and goal of this problem, the study seeks to

empirically identify variables that affect the average user's perceived value and acceptance of autonomous vehicles

2.3 Value-based Adoption Model

2.3.1 Meaning and Characteristics of Value-based Adoption Models

The study aims to utilize value-based adoption model, a valid analysis model related to the acceptance of new technologies, to more logically and scientifically analyze factors affecting individual users' acceptance of autonomous vehicles, which may serve as key indicators or guidelines for establishing strategies for the popularization, dissemination, and activation of autonomous vehicles. It is the cutting-edge new technology every moment amid the innovation of digital and mobile technologies that began in earnest in the second half of the 20th century and the trend of the Fourth Industrial Revolution in the near future. And as innovative tools and equipment are constantly being developed and distributed, New technology, and various theories related to technology have been proposed to analyze and discuss psychological and behavioral characteristics or factors that positively affect the general users' intention and intention to use the new product (Shim Yoon-jung), 2018). Representative theory is ①The Innovation Diffusion Theory of Benbasat (1991), ②Fishbein, Ajzen(1975): The Theory of Reasoned Action, ③The Social Cognitive Theory of Highgins (1995), ④Ajzen(1985), Ajzen, Theory of Planned Behavior suggested by Fishbein (1980) and others, ⑤The Technology Acceptance Model proposed by Washaw (1989) and others, and ⑥Value-based Adoption Model, suggested by Kim, Chan, and Gupta (2007). These perceive the value and utility of the individual users' new technologies and new products from various points and perspectives, and derive cognitive, psychological and social variables that may influence voluntary acceptance and use (Jaehyun Yoo, Chul Park, 2010).

To summarize the contents of each theory in a table, it is as follows.

Table 2. 2
Major analytical theory related to the intent of accepting new technology

Theory	Prior Study	Main contents
Innovation Diffusion Theory	Moore, Benbasat (1991)	An analytical framework for studying the adoption of personal innovation and the process of adoption and diffusion of social innovation. A theory focusing on the correlation between the point at which members of society accept and adopt various innovations, such as new ideas, technologies, and things, and the speed of the resulting spread of innovation and the causes of them.
Theory of Reasoned Action	Fishbein, Ajzen (1975)	Under the assumption that the various behaviors of an individual are determined by the intention of action, it is a theory that focuses on increasing the predictive power between attitude and behavior by analyzing the influence between action and intention, the relationship, and the role of the subjective norms that mediate it. It is pointed out that there is a limit to applying it to reality because it does not take into account variables of external effects, such as the influence of others, and the environment of society.

Social Cognitive Theory	Compeau, Higgins (1995)	A theory that analyzes that an individual's behavior is determined by the interaction between individual characteristics and the environment and that the effect of learning appears in the process; an analytical model that emphasizes the cognitive and learning aspects of an individual's behavior.
Theory of Planned Behavior	Ajzen, Fishbein (1980)	A theory that analyzes that the performance of an individual's behavior is determined in consideration of a prepared intention or plan, which is to measure the impact of a planned or controllable attitude on an individual's particular behavior, which is to predict the intent of the user's behavior based on three variables: plans, prepared attitudes, perceived norms, and control over behavior.
Technology Acceptance Model	Davis (1986)	A theory that analyzes the correlation between the intent of acceptance of new technology or innovation, individual values, social and cultural beliefs, and past and present experiences. It analyzes the users' adoption intention through variables such as perceived adoption of the content of new technology or innovation, perceived utility, attitude to adoption, intention of action, and actual adoption.

Value-based Adoption Model	Kim, Chan, Gupta (2007)	A theory that argues that not only positive factors such as perceived benefits in the adoption of new technologies or innovative products by individual users, but also negative factors such as perceived sacrifices have an impact at the same time. This is evaluated as a more balanced theory that takes into account not only the positive effects but also the negative effects of new technologies and new products.

However, previous studies analyzing the behavior of users who adopt new technologies, new products, and new equipment using the above theories reveal problems that unilaterally emphasize the fact that new technologies, products, and equipment adopted by the users' active and subjective intention or rational and planned attitude provide users with positive effects such as benefits (Kim Yong-hee, 2016). In practice, the results users gain from the adoption of new technologies and tools are bound to intersect with both positives and negatives, so there is a need for a more balanced and equitable measurement of these two-sided outcomes (Kim Min-jung, Lee Soo-beom, 2018). In addition to the positive results such as the benefits from the adoption and utilization of new technologies, the cost, time, effort, and opportunity costs involved in embracing this technology should also be considered (Lil, Lee Kyung-geun, 2007) The theoretical model proposed to respond to this need is 'VAM', and it is a balanced analytical model that takes into account all the benefits and sacrifices to be made in the process of adopting the new technology (Kim, Chan, Gupta, 2007).

According to the value-based adoption model, if users are aware of the adoption intention or purchase of new technologies or products, it is to be aware of the value of

new technologies and new products as a basic premise, which is called the perceived value (Lee Eun-ji), 2019). Perceived value, which directly drives users' intention to adopt or purchase, is the usability and convenience they can gain from new technologies or new products. And at the same time, it is triggered and enhanced by positive factors such as the pleasure of the process of use, the financial costs or efforts to be paid to accommodate new technologies and new products, time, and the expected challenges and complexity of this process. which can be degraded or reduced by negative factors (Kim Juyeon, 2020).

In this sense, in order to continuously induce and encourage users' perceived value and adoption of new technologies and new products, it would be necessary to improve and maximize the various benefits and benefits acquired and perceived by new technologies and new products, and sacrifices, costs, and difficulties that would otherwise have to be reduced or overcome (Lee Se-yoon, 2020). The more one strengthens the perceived benefits of perceived values and adoption intentions, and reduce and minimize the perceived sacrifices that are negative factors, the stronger the perceived values and adoption intentions are expected to be (Noh Mi-jin, Park Hyun-hee, Jang Hyung-yoo, 2011). This is both the core and theoretical strength of the value-based adoption model. Under this balanced and neutral view, in the value-based adoption model, various variables related to the process of adopting new technologies were presented with 'convenient benefits' and 'convenient sacrifice' as independent variables, 'convenient values' and 'adoption intentions' as dependent variables, and analytical models such as [Figure 2.1] for the impact relationship between them.

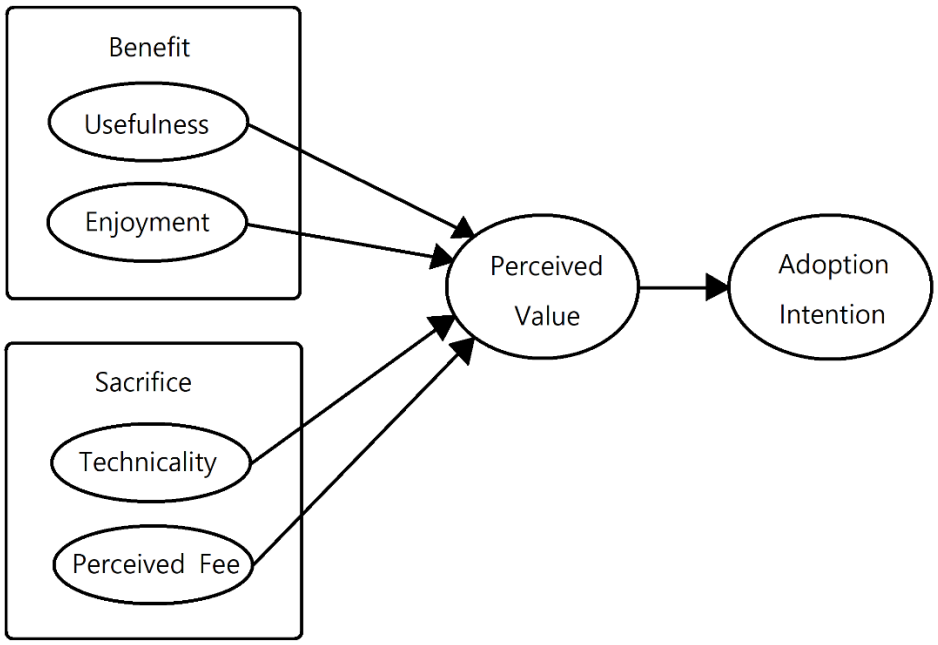

Figure 2. 1
Criteria for classification by stages of autonomous-driving

According to the above diagram, the sub-factors that constitute "perceived benefits" from the adoption of new technologies and products are "perceived usability" and "perceived enjoyment", etc., and the sub-factors that constitute "perceived sacrifices" for the adoption of new technologies and products are technicality, and perceived fee (Encounter, Jeon Hyun-mo, 2020). Perceived usability means the degree to which a new technology or product is useful to users' daily lives, tasks, etc., and perceived pleasure means joy and satisfaction from adopting and using new technologies and products (Davis, 1989). Technology means the degree of mental and physical effort or time that users have to put in to understand and how to use and manipulate new technologies and new products, or the degree of difficulty or technical complexity in the process, and the perceived cost means the financial costs that users have to invest in new technologies and new products (Lee Eunji, 2019).

As seen so far, the value-based adoption model, which fairly considers complex and difficult situations or negative consequences to endure and endure without considering only positive effects or benefits in relation to the adoption of new technologies and new products, has theoretical, academic, and practical implications in that it guarantees the balance and neutrality of the analysis, while also reflecting on the improvement and supplementation of new technologies and new products (Hyun Hyo-won, 2020). Considering these theoretical advantages and the balance and rationality of analysis, this study seeks to analyze and verify positive and negative variables that affect the general users' perceived value and adoption of autonomous vehicles with higher public interest among various new technologies that make up the Fourth Industrial Revolution.

2.3.2 Component Variables

Based on the above understanding of the meaning, structure and analytical advantages of the value-based adoption model, the meaning, characteristics, and related discussions of the independent and dependent variables that make up the model are as follows.

2.3.2.1 Perceived Benefit

'Perceived benefits', the first independent variable proposed through the value-based adoption model, refers to the degree to which new technologies and new products help improve users' daily lives and work performance, not only provides practical usability and convenience, but also causes psychological and emotional pleasure and satisfaction (Lee Seo-yoon, Lim Hee-rang, Kim Hak-sun, 2019). The perceived benefits are key variables that have a direct and positive impact on the value and adoption of new technologies and new products, and a number of preceding studies explain the detailed

meaning and components of the perceived benefits. First of all, Peter and Olson (1987) identified this as positive effects that users expect in the process of purchasing and using new technologies and new products for perceived benefits, as well as subjective compensation for investment cost, time and effort. Thoughts and evaluations of positive effects, rewards and benefits from new technologies and new products may vary from user to user. In this sense, the perceived benefits are not quantitative and objective indicators that can be measured, but qualitative and internal indicators cognitively and psychologically perceived and recognized by the user (Kerin, Jain, Howard, 1992). In addition, these qualitative and internal indicators can be perceived differently depending on the situation and context and by the specific types and characteristics of new technologies and new products.

In the value-based adoption model, two factors were proposed: perceived utility and perceived pleasure as sub-factors of perceived benefits. The first factor, perceived usability, means the degree to which users perceive that new technologies and new products actually contribute to the improvement of their daily lives or tasks (Ji Young-soo, Kang Moon-young, Choi Jung-il, 2016). This means that users have increased efficiency and convenience in their daily lives and tasks rather than before adopting new technologies, as well as a psychological motivation to form an intention to accept new technologies and new products based on them (Venkatesh, 1999). This perceived usability has a positive impact on the perceived value and adoption of new technologies and new products (Mathieson, 1991; Szajna, 1996).

Perceived pleasure, the second factor of perceived benefits, means psychological and emotional joy and pleasure that users feel in a particular environment or context (Eroglu, Machleit, Davis, 2003). Perceived pleasure refers to the extent perceived to be entertained by the use of new technologies apart from the actual performance, utility and

convenience expected from the use of new technologies and new products (Jeon Hyun-mo, Kim Young-guk, 2018). Through the process of using new technologies and new products, users who experience not only practical utility and convenience but also emotional enjoyment may intend to more frequently and actively utilize new technologies by simultaneously confirming the tool and emotional value of new technologies (in addition to Lee Yoon, 2019) (Davis, et al, 1989). It will also be necessary to pay attention to perceived pleasure, direct and positive factors that drive user positive response, adoption and purchase, as the ultimate goal of empirical research on new technologies and new products is to promote user adoption and intention to purchase, or to establish and seek strategies to help the successful dissemination and commercialization of new technologies and new products.

2.3.2.2 Perceived Sacrifice

The 'perceived sacrifice', the second independent variable proposed in the value-based adoption model, is the psychology that users must bear and overcome in the process of embracing and continuously using new technologies and new products, and it means all the costs to be sacrificed in exchange for contextual difficulties or the use of new technologies and new products (Kerin et al., 1992). Generally perceived sacrifices consist of monetary and nonmonetary factors (Zeithaml), 1988). The financial factor is the financial cost or financial burden that users actually pay when purchasing and using new technologies and new products. Non-financial factors are referred to as intangible factors such as time, effort, and opportunity cost, or psychological and emotional dissatisfaction, anxiety, and concern (Kim, Chan, Gupta, 2007).

In the value-based adoption model, two types of factors were proposed: technical characteristics and perceived costs as subfactors of perceived sacrifice. The first factors

are the difficulty of use perceived by the user (Yang Hee-jin, Choi Sung-chul, 2011), the difficulty of acquiring or learning how to use the new technology (Venkatesh et al., 2016), the amount of time required to use it (Lin et al., 2012), the excellence and expertise of the new technology, and the proportionate operational complexity and psychological burden (Jiang, Klein, 2019).

These technical characteristics are a non-unusual factor among perceived sacrifices, which results in the user's mental and physical efforts, the resulting burden, and loss of opportunity costs, so companies that develop and provide new technologies and new products should focus on minimizing the negative effects of technological characteristics (Davis, 1989). If it is to reduce the psychological and emotional burden of technical characteristics while encouraging the users to use new technologies and new products more easily and conveniently while feeling less difficulty or complexity, the users' perceived pleasure and usability will also increase (Sahinoglu, Ang, 2012). In this sense, technical characteristics, perceived pleasure, perceived usability, etc. are inverse to each other. The easier it is for an individual user to understand and use new technologies and new products, the shorter the time for the user to adopt or purchase new technologies and new products. On the contrary, the more difficult it is to understand and complex the new technology, and the intention to adopt and purchase new products may be reduced or withdrawn altogether (Rogers, 1995), many previous studies have pointed out that difficult and complex technical characteristics are representative factors hindering the adoption of digital and mobile technology (Blocker, 2011).

Perceived costs, a second factor of perceived sacrifices, refer to the financial and financial burdens or losses that users actually have to pay for or invest for the adoption, use, and purchase of new technologies and new products, and these costs can be a significant hindrance to the adoption of new technologies in that they can worsen the

users' financial situation, not only as a one-off loss but also in the mid- to long-term (Cho Ga-yung, 2020). The higher the expertise and excellence of new technologies and new products, the higher the perceived costs, and the userss adoption intention tends to decrease (Kim Yong-hee, 2016). Therefore, setting a reasonable price that minimizes the negative impact of the perceived cost on the users' intention and does not harm the performance of the business is very important for the successful distribution of new technologies and new products.

Some of the previous studies that analyzed adoption intentions for various types and types of new technologies using value-based adoption models added perceived risk as another subfactor of perceived sacrifice. Perceived risks refer to subjective risks, psychological burdens, and fears that occur in the process of adopting, purchasing or using a new technology or a new product (Bae In-ho, 2019). A perceived risk may lead to an attitude to withhold or withdraw the adoption or purchase of new technology while worrying about the negative consequences, financial and social loss, etc. which may occur as a result of the selection and use of new technology (Chun Myung-hwan, Jung Chul-ho, 2012). The perceived risk to users is digital and mobile related new technologies, and it is very common in new products. It is especially more frequent and apparent in financial areas, which confirms more cases of additional composition of perceived risks as independent variables in prior studies related to new technologies in the digital and mobile financial sectors. (Kim Ah-reum, 2021). Internet banking or fintech, and when it comes to new e-commerce technologies and new services, users become more aware of a variety of risk factors such as personal information leakage and security issues. As a result, they tend to hesitate or withdraw the adoption of the relevant new technology (Dan Ryeo-ni, Jeong Cheol-ho, Kyung-hye Park, 2012). So this minimizes perceived risks to new technologies and new products, ensuring users' safety

and benefits by giving users enough confidence and stability. This is likely to require a reasonable strategy to successfully distribute and commercialize new technologies and new products.

2.3.2.3 Perceived Value

'Perceived value', the first dependent variable of a value-based adoption model, refers to various values, utility and benefits that a user or consumer feels and recognizes new products, new technologies, etc. (Kim, Chan, Gupta, 2007). The original value is interpreted and utilized in a variety of concepts, depending on context, economics, business administration, accounting, finance, marketing, and not just business, this is in psychology, sociology, and it is a concept that is emphasized in all fields of education and so on (Gain et al., 2017). In terms of value in a more general sense, Sheth et al.(1991) divided it into social value, functional value, conditional value, epistemic value, and emotional value, explaining that these different types of values have a different impact on the user experience. For reference, Hyun Hyo-won (2020) identified the perceived value of products regarding Internet of Things as the above five factors and analyzed the results of a survey of users based on this, and reported that only situational and cognitive value among the five sub-factors of perceived value had a significant positive effect on the user's attitude and did not affect functional value, emotional value, and social value. Through this, it is confirmed that the users or consumers who mainly purchase and use home system control and health care Internet of Things products value and prefer practical advantages, values, and subjective values that they can recognize and experience according to the situation, purpose, and context of the use of Internet of Things products.

The evaluation, response, and value that users feel about new technologies, new products, new services, and systems differ from individual to individual, and the perceived value is a concept proposed while emphasizing the subjectivity and relativity of this value (Yang, Peterson, 2004). Holbrook (1999) argues that there are eight elements in perceived values: quality, convenience, pleasure, success, reputation, faith, beauty, and good.

Dividing the value of the product perceived by consumers who frequently drink by choosing a particular beverage product into the objective and external quality of the product and the internal and subjective characteristics of the product, Zeithaml (1988) explained that the perceived value consists of the sum of such objective, subjective quality, and perceived characteristics. Dodds et al. (1991) set the high quality, usability, and brand awareness of the companies that produced the products as a component of consumers' perceived value for calculators and headsets, while Sweeney et al.(1997) cited the quality of products and the quality of technology services as consumers' perceived value for electronics.

The value of users' perception of new technologies and new products can be understood as the sum of these various detailed quality or characteristic factors. In this regard, the value-based adoption model defines the perceived value of the perceived benefits proposed as an independent variable, and the value-based adoption model defines the perceived value by adding the benefits and sacrifices that users can feel and experience in the process of adopting and purchasing new technologies and new products as positive and negative (Yoon Yeo-joon, Shin Dong-cheon, 2017). When they want to adopt or decide whether to adopt or purchase a new technology or a new product, they tend to judge the perceived value by comprehensively considering the perceived benefits and the perceived sacrifice (Roostika, 2012). Therefore, the perceived value defined in

the value-based adoption model can be understood as an overall and comprehensive assessment of new technologies and new products based on perceived benefits and perceived sacrifice. Based on this overall assessment, users determine intentions and actions related to adoption, choice, and purchase (Choi Yoon-hee, Lee Yeon-jung, 2016).

The higher the users' perceived value, the greater the positive impact on adoption, behavior, and continued use of new technologies and new products, which can be directly linked to the success of new technologies and new products (Min Ji-sook, Lee In-ok, Kim Tae-hee, 2019) Considering this, companies that develop and distribute new technologies and new products will have to constantly strive to launch more useful and convenient new technologies and new products while focusing on strategies to maximize perceived benefits and minimize perceived sacrifices. Even if users perceive a partial sacrifice for new technologies and new products, if the perceived benefits are much greater than the perceived sacrifice, the perceived value of the total is bound to be positive, which can lead to active adoption and continued use. In this sense, perceived value is a direct and key driver and a primary and preceding variable that drives users' positive and friendly responses and attitudes toward new technologies and new products, which is extremely significant.

2.3.2.4 Adoption Intention

'Adoption intention', the second dependent variable of the value-based adoption model, means that the user or consumer is clearly aware and convinced of the various benefits and values of new and new technologies, and then the psychological attitude and willingness to voluntarily adopt new technologies and new products based on them (Kim, Chan, Gupta, 2007). If the positive experience of new technologies and new products after first adopting new technologies and new products is repeated and accumulated, the

technology or product may deepen with the intention to use them continuously and iteratively (Taylor, Todd, 1995).

The adoption intention is an important concept in observing and understanding users' responses, attitudes, and behavior to new technologies and new products, and is described as a direct link between psychological attitudes toward new technologies and new products and a direct driver that drives the actual behavior (2018). In this sense, the perceived value of the two variables presented in the value-based adoption model can be interpreted as primary and preceding variables that induce the adoption intentions, and the adoption intentions can be interpreted as secondary and follow-up variables promoted under the influence of perceived value. In addition, a number of previous studies have focused on the intention of continued use, which is the result of deepening and improved adoption intentions, and are also interested in demonstrating the relationship between the perceived value, the adoption intention and the gradual and step-by-step process of intent to continuous use, and mutual impact (Sung Hyun-a, 2020; Hyun Hyo-won, 2020). In order to induce adoption from the perceived value of new technologies and new products, more efforts should be made by developers and suppliers of new technologies and new products.

The ultimate goal of studies analyzing user attitudes, intention, and behavior of new technologies and new products is to identify these industrial, economic, cultural, and social values by suggesting strategies for successful popularization and commercialization of new technologies and new products. The goal for successful popularization and commercialization is to effectively induce and promote intention for sustainable use, the most advanced and final stage of user behavior. Through this, companies that develop and supply new technologies and new products want to build long-term and continuous trust relationships with users or customers. In this sense, it is to

see that its intention for adoption and its intention for continued use, which is an advanced step, are important both theoretically and in practice.

2.3.3 Study of Prior Research

So far, it was examined the detailed meaning, theoretical structure, and related variables of the value-based adoption model. Based on this value-based adoption model, a number of previous studies have proved and reported that the benefits of new technologies and new products and the sacrifices they have to make (time, effort, technical difficulty, and financial cost) have a significant impact on the users' perceived value and adoption intentions. The main research results are as follows.

First of all, Cho Ga-ryeong (2020) recently demonstrated the impact of Airbnb, a new type of shared accommodation platform that is increasing brand recognition at home and abroad, on user evaluation and intention using a value-based adoption model. The study selected perceived benefits as an independent variable of the value-based adoption model as a variable for measuring the characteristic factors of Airbnb, and added perceived convenience along with perceived usability and perceived pleasure as sub-factors. Perceived ease was defined as ease of operation, ease of use, and technical ease that users feel while using the platform. As dependent variables, the intention to create and reuse common values, along with perceived values, was selected. The intention to create and reuse common values are variables adopted instead of the adoption intentions, such as by adding new variables and subfactors to the underlying variables (such as perceived sacrifice, perceived value, and adoption intention) and each sub-actor (such as perceived utility and perceived pleasure, and technical and perceived costs, which are the lower factors of the perceived sacrifice) to suit the subject or subject of the study, or

appropriate variations and applications could be attempted, such as replacing some variables and subfactors with other variables and factors.

According to the analysis, first, both the perceived benefits of Airbnb and its three sub-factors have a positive effect on perceived value, especially among the three subordinate factors, perceived pleasure has the greatest impact on perceived values. Second, it has been shown that the perceived benefits of Airbnb, while perceived usability and perceived pleasure, among the three sub-factors, have a significant positive impact on the creation of common value. In response, the study suggested that if the Airbnb platform wants to create universal and desirable common value through user participation, it should focus on providing practical usability and benefits rather than simply emphasizing convenience and convenience. Third, perceived values were found to have no significant impact on the creation of shared values. Fourth, perceived values have been shown to have a positive impact on reuse intentions. Fifth, the creation of common values has been analysed to have a positive impact on reuse intentions.

Based on this analysis, the study proved that the various advantages and practical benefits of the new travel accommodation platform applied with new technology can induce users' positive evaluation, intention to use and reuse, resulting in close interaction between businesses and users, information sharing, and desirable shared value. Through this, the study showed appropriate examples of the application and transformation of variables and sub-factors according to the theme and design of research in the process of utilizing the value-based adoption model. At the same time, the analysis shows that new technologies and new products not only have a positive impact on the users' intention to use, but can also create desirable social values (joint value), as well as industrial and commercial effects of new technologies and new products, and as well as cultural and social effects and shared value. It is thought that this will confirm the need and

justification to continue to investigate, measure, and analyze the values and users' evaluations and attitudes of various new technologies and new products that are newly developed and released every moment.

Next, Hyun Hyo-won (2020) introduced and utilized the value-based adoption model as a theoretical and analytical tool in a study that analyzed the impact of the product quality of Internet of Things on the users' attitude of use and the intention of continuous use. In this process, the study added a new social impact in addition to the independent variables, the perceived benefits and the perceived sacrifice, and the dependent variables adopted and configured the perceived value, usage attitude, and the intention of continuous use, and the impact and relationship between the three independent variables and the three dependent variables were analyzed. In addition, in order to measure the user's perceived value more diversely and in depth, five sub-factors of functional value, situational value, emotional value, social value, and cognitive value were newly derived and constructed through consideration through the literature..

According to the analysis, first, both perceived benefits and perceived sacrifices have a significant impact on the perceived value of the products of the Internet of Things, and the social impact, an added independent variable, also has a significant impact. Second, among the five sub-factors that make up the perceived value of the product of the Internet of Things, only situational and cognitive values have a positive impact on another dependent variable, usage attitude, and functional value, emotional value, and social value are not affected. Third, users' positive attitude toward products in the Internet of Things has been shown to have a significant impact on the intention of continuous use. With these results, this study showed a methodological application of the value-based adoption model while providing important implications related to the users' attitude and

response to the development of products and strategies of the Internet of Things, which is one of the representative new technologies of the Fourth Industrial Revolution.

Meanwhile, Kim Yong-hee (2016)'s study also used a value-based adoption model while analyzing the impact of the quality of smart home service products using the Internet of Things technology. In this study, by introducing and applying the basic structure and variables of the value-based adoption model, perceived benefits and perceived sacrifices as independent variables measuring the quality of the products of smart home services were selected as the intention of perceived value and adoption as dependent variables, from which the relationship between the two influences was analyzed. According to the analysis, perceived benefits have a positive effect on the intention of perceived value and adoption, and perceived sacrifices have a negative impact. However, as the positive effects of perceived benefits were much higher than the negative effects of perceived sacrifice, users' perceived value and adoption of smart home service products were analyzed to be quite strong and positive as a result. Based on this, the study predicted that the subscription rate and utilization of users will be high when Internet of Things-based smart home services are popularized and commercialized in the future. In particular, the study compared and analyzed the respondents' attitudes and responses to smart home services based on their general characteristics and found that female users showed higher preference and perceived value. The content of this analysis is distinct from the general expectation that men will be more active and active in their intention of adopting and using new technologies and new products, suggesting that it is extremely important to have accurately identified and targeted strategies that show more favorable attitudes, preferences, expectations, and subjective needs, depending on new technologies, new product types, detailed types, and areas. In this sense, the necessity and validity of research on the impact of new technologies and new products on users'

attitudes and adoption intention can be reaffirmed. In particular, drawing a group of users characterized and subdivided according to new technologies and new product types, and analyzing and identifying their attitudes, perceived value and intention is essential for business.

Sung Hyun-ah (2020) used a value-based adoption model as a tool for analysis in a study that analyzed the impact of smart order services at coffee shops on users' attitudes and intention of continuous use. In the process, the study included additional sub-factors that make up the perceived benefits of smart order services with new technology: perceived utility, perceived pleasure, perceived convenience, and perceived ubiquitousness. For another independent variable, the sub-factors of perceived sacrifice, technical characteristics, perceived costs, resistance to innovation, and privacy concerns were added, and dependent variables such as perceived value and intention of continued use were selected. In addition, the users' desire for interaction and social innovation were newly selected and configured as regulatory variables, demonstrating the effect of the relationship and control between independent and dependent variables on the relationship between independent and dependent variables in order to analyze the effects of adjustments that are not in the value-based adoption model. In this sense, this study also presented an appropriate case for expanding and applying the value-based adoption model to the subject and design of research.

As a result of the analysis, first, perceived usability, perceived convenience and perceived pleasure among the perceived benefits of smart order services have a significant positive impact on perceived value, while perceived ubiquitousnesss are not affected. Second, technical characteristics and perceived costs among the perceived sacrifices of smart order services have a significant negative impact on perceived value, while resistance to innovation and concerns about privacy have no impact. Third, the

perceived value of smart order services has been analyzed to have a significant positive impact on the intent of continuous use. Fourth, interaction needs and social innovation, which are adaptive variables, have been proven not to regulate the relationship between independent variables and dependent variables.

Lee Eun-ji (2019) introduced and utilized a value-based adoption model in a study that analyzed the impact of the characteristics of digital news, which has become the latest trend in the field of media over the past decade on user behavior. In this study, the perceived benefits of digital news and perceived sacrifice were selected as independent variables, and as subordinate variables, the perceived values and the behavior of news sharing were selected. The act of sharing news was defined as the act of pressing 'likes' in digital news released on portals to show positive evaluation and preference, the act of commenting in favor of the relevant articles, and the act of linking or posting articles that are evaluated and sympathized as excellent and useful contents to personal sites.

As a result of the analysis, first, the perceived benefits of digital news have been shown to have a positive impact on perceived values and behavior to share news. Second, the perceived sacrifice of digital news has been shown to have a negative impact on perceived values and the behavior of sharing news. Third, as a result of analyzing whether the perceived value represents a mediating effect in the impact of the perceived benefits and perceived sacrifice of digital news on the behavior of sharing news, it has been proven that there is a full mediating effect or partial mediating effect for each specific type of news. Through the results of this analysis, the study provided useful business implications while deepening the scientific understanding of the attitudes, responses, and evaluations of users or subscribers of the news, which could have a significant impact on the continuous and long-term development of digital news, and which will be the latest trend in the media and a key trend in the future.

In Yoo-hoon (2018), a value-based adoption model was used in a study that analyzed the impact of self-customization service applying new technology on users' attitudes and behavior. The study defined self-customization service, the subject of analysis, as a personalized one-on-one service that allowed customers to design and purchase products they wanted by using "PC or mobile devices," and users' responses and attitudes were demonstrated, predicting that self-customization service will become common and commercialized within 10 years. Independent variables measuring the characteristics of self-customization service, a key new technology of the future, included perceived benefits and perceived sacrifice, while sub-factors of perceived benefits included perceived usability and perceived pleasure, and sub-factors of perceived sacrifices included technical characteristics, Innovation resistance other than perceived costs, and anxiety.

As a result of the analysis, first, perceived usability and perceived pleasure among the perceived benefits of self-customization service have a significant positive effect on perceived value. Second, the technical characteristics, perceived cost, and anxiety among the perceived sacrifices of self-customization service have a significant negative impact on the perceived value, and the resistance of innovation does not have a significant impact. Third, the perceived value of self-customization service has been analyzed to have a significant positive impact on the intention of use. Based on the results of this analysis, this study suggested a strategy for successful development and development of future services in the convergence and application of various new technologies by identifying the actual responses and intentions of general users who can have a decisive impact on the popularization and commercialization of self-customization service, which is expected to be a key and leading trend in future marketing and business areas.

Kim Min-jung and Lee Soo-beom (2018) applied a value-based adoption model in the process of analyzing users' attitudes and actions toward restaurant delivery application services, which have recently soared in public interest and utilization. Due to the Covid-19 pandemic, which has expanded worldwide, the restaurant delivery application service has greatly increased its utilization and preference almost like a daily necessity in Korea, which is thought to have increased the usability, timeliness, and academic implications of this research. In this study, the perceived benefits and perceived sacrifices of delivery applications were selected as independent variables. The sub-factors of the perceived benefits included the quality of the system, the quality of service, and the quality of information. The subfactors of perceived sacrifices included perceived risks with technical characteristics and perceived costs. Dependent variables included perceived value and continued use intent, as well as user resistance.

The analysis showed that first, the quality of the system and the quality of service among the perceived benefits of delivery applications have a significant positive impact on perceived value, while the quality of information does not have a significant impact. Second, it was analyzed that perceived risks among perceived sacrifices of delivery applications have a significant negative impact on perceived value, whereas technical characteristics and perceived costs have no impact. Third, among perceived sacrifices, technical characteristics, perceived costs, and perceived risks all showed significant positive impacts on user resistance. Fourth, the perceived value of delivery applications was analyzed to have a significant negative impact on user resistance, as well as a significant positive impact on the intention of continuous use. Fifth, user resistance to delivery applications has proven to have a significant negative impact on continued use intentions. In particular, the study analyzes user attitudes and behavior toward new technologies and new products as not only positive aspects such as perceived value,

acceptance, and intention to use, but also the negative aspects of user resistance, which is believed to have academic implications in that there are broader and interactive implications related to negative user attitudes and behaviors that have not been considered in the value-based adoption model.

In Kim Ah-reum (2021), a value-based adoption model was used in a study analyzing users' responses and intentions to robo-advisor, a new technology that is gaining increasing interest in finance and asset management. In this study, robo-advisor's perceived benefits and perceived sacrifices were adopted as independent variables, which consisted of five factors of perceived benefits: objectivity, profitability, diversity, convenience, and expertise, and three factors of perceived sacrifices: technical characteristics, perceived cost, and security of personal information. As dependent variables, the perceived value and intention of use were selected, and the relationship between these and the independent variables was analyzed. In addition, user innovation has been added as a control variable, demonstrating whether user innovation has a controlling effect on the relationship of impact between independent and dependent variables.

According to the analysis, first, among robo-advisor's perceived benefits, profitability and expertise have a significant positive impact on perceived value, objectivity, diversity, and convenience that are not affected. Second, it was analyzed that the technical characteristics, the perceived cost, and the security of personal information among the perceived sacrifices of robo-advisor do not affect the perceived value. Third, the perceived value of robo-advisor has been shown to have a significant impact on the intention of use. Fourth, it has shown that user innovation does not control perceived benefits, perceived sacrifice, the impact relationship between perceived values and perceived benefits, and the impact relationship between perceived sacrifice and intention

to use. To sum up these results, the study suggested that robo-advisor, a notable new technology in the fintech field, should focus on a strategy to maximize users' perceived benefits and minimize sacrifices in order to gain users' trust, while focusing on developing and supplementing technology.

In Kim Sang-hyun, Park Hyun-sun, and Kim Bo-ra (2020), value-based adoption models have been used to analyze the perceived value of cloud computing, which are representative new technologies that make up the Fourth Industrial Revolution and the impact of users' trust on the intention of continuous use. In this study, perceived benefits and perceived sacrifices were selected as independent variables, and it included three sub-factors of perceived benefits: perceived utility, perceived pleasure, convenience of information access, and scalability, and three sub-factors of perceived sacrifice: technical characteristics, perceived costs, and privacy concerns. As a dependent variable, after selecting the perceived value, the users' trust, and the intention of continuous use, the impact of relationship between the independent variable and the dependent variable was analyzed.

As a result of the analysis, first, perceived usability, convenience of information access, and scalability among the perceived benefits of cloud computing had a significant positive effect on the perceived value, and the perceived pleasure was not affected. Second, privacy concerns and perceived costs among the perceived sacrifices of cloud computing had a significant negetive impact on perceived value, and technical characteristics had no impact. Third, it turned out that users' trust in cloud computing had a significant impact on perceived value and intention to use it continuously. Fourth, it was analyzed that the perceived value of cloud computing had a significant impact on the intention of continuous use. With these results, the study provided guidelines to help individual users understand the characteristics of factors and qualities that are considered

important in relation to the currently steadily growing domestic and overseas cloud computing industries, laying the groundwork for the establishment of strategies to contribute to the popularization and commercialization of cloud computing technologies.

In addition, a study by Ki Eun-hye and Jeon Hyun-mo (2020), which analyzed the perceived value and adoption of mobile apps by newly launched online travel agencies, and their positive and negative effects and impact were demonstrated in a study in which the perceived value of the mobile app of the latest ticket search and the intention of continuous use was analyzed by Choi Kyung-ok and Lee Hyung-ryong (2019), respectively. The results of these various previous studies were able to clearly confirm the analytical advantage and usability of the value-based adoption model, which is a useful guide and tool for analysis, amid the continued development and distribution of new technologies and new products that have become the core trend of the 21st century, and the accelerating development of advanced technology. Here is a summary of the major prior studies using the value-based adoption model that was looked at so far.

Table 2. 3
Summary of Major Prior Studies

Prior Research	Analysis Contents and Results
Jo Ga-ryeong (2020)	The perceived benefits (the perceived utility, perceived pleasure, and perceived ease) of Airbnb, a new type of shared accommodation platform, have proven to have a significant impact on perceived value, the intention to re-use, and the creation of shared value.

Hyun Hyo-won (2020)	The perceived benefits and perceived sacrifices of the Internet of Things, one of the representative new technologies of the Fourth Industrial Revolution, have a significant impact on perceived values (functional value, situational value, emotional value, social value, and cognitive value). It has been proven that situational and cognitive values among perceived values have a positive impact on the attitude of use. Presentation of a new research model in which the value-based adoption model is applied and expanded to the subject.
Kim Yong-hee (2016)	It has been proven that the perceived benefits and perceived sacrifices of the Internet of Things-applied smart home services have had a significant impact on the perceived value and the adoption intention. Based on this, successful popularization and commercialization of smart home services based on the Internet of Things is expected in the future.
Seong Hyun-a(2020)	It has been proven that the perceived benefits of a smart order service of a coffee shop applied (new technology, perceived utility, perceived pleasure, perceived convenience) and perceived sacrifices (technical characteristics, perceived cost, innovation resistance, privacy concerns) that have a significant positive and negative impact on perceived value and continued use, respectively, and that the relationship between independent and dependent variables and control variable, is not controlled. The methods and design models of a new analysis in which the value-based adoption model applies and extends to the subject of the study are presented.
Lee Eun-jee (2019)	It has been proven that the perceived benefits and perceived sacrifices of the new trend and digital news have had a significant impact on the perceived value of news users and the behavior of news sharing, and between the perceived benefits and the behavior of news sharing.

Yoo-Hoon (2018)	The perceived benefits of self-customization service with new technology (new technology, perceived utility and perceived pleasure) and perceived sacrifices (technical characteristics, perceived costs, and anxiety) have been proven to have a significant impact on the perceived value and the intent of its use. Based on this, this suggests a strategy for practical response, behavior, and appropriate utilization of general users, which may have a decisive impact on the popularization and commercialization of self-customization service, which will be a key and leading trend in future marketing and businesses.
Kim Min-jeong and Lee Soo-beom (2018)	The perceived benefits of food delivery applications (system quality, service quality, and information quality), perceived sacrifices (technical characteristics, perceived cost, perceived risk) have been proven to have a significant impact on perceived value, intent of continued use, and user resistance. With the introduction of a new dependent variable of user resistance, the application and supplementation of a model of value-based adoption is presented.
Kim Ah reum (2021)	The perceived benefits of fintech robo-advisor of new technologies (subjectivity, profitability, diversity, convenience, and expertise) and the significant impact of perceived sacrifices (technical characteristics, perceived cost, and security of personal information) on perceived value and intent of use are verified.
Kim Sang-hyun, Park Hyun-sun, Bo-ra Kim (2020)	The representative new technologies that make up the Fourth Industrial Revolution, the perceived benefits of cloud computing (including perceived utility, perceived pleasure, convenience of access to information, and scalability), perceived sacrifices (technical characteristics, perceived costs, and concerns of privacy) have been proven to have a significant impact on perceived values, user trust, and the intention of continued use, resulting in the successful popularization

	and commercialization of cloud computing and the potential for sustainable development.
Kim Ju-yeon (2020)	The perceived benefits of the newly launched online travel agency's mobile app, the perceived value of the perceived sacrifice, and its significant impact on the intention of adoption are proven.
Gi Eun-hye and Jeon Hyeon-mo (2020)	The perceived benefits of the state-of-the-art accommodation app and its significant impact on the intention of sustained use of perceived sacrifices have been demonstrated.
Choe Gyeong-ok and Lee Hyeong ryong(2019)	Demonstration of the perceived benefits of mobile apps of the latest ticket searches, the perceived value of perceived sacrifices, and a significant impact on the intention of continued use.

With reference to the previous studies that have been examined in detail so far, it will be quantitatively verified through a survey of individual users on the subject of this study, the perceived benefits of autonomous vehicles, the perceived sacrifice, and whether the perceived value and acceptance of each sub factor had a statistically significant impact.

2.3 Optimistic Bias

2.3.1 Meaning of Optimistic Bias

The ultimate goal of this study is to be a marketing strategy to help successfully popularize and commercialize autonomous vehicles by analyzing and verifying variables that affect the perceived value and adoption of autonomous vehicles, which will be the

core and leading technology of the future. In order to make these goals more multi-faceted, this study will select and analyze additional variables other than the two independent variables proposed in the value-based adoption model, which is the main analysis tool. In other words, as the application and expansion of the proposed value-based adoption model of many of the preceding studies are introduced and applied to this study, cognitive and psychological variables that affect the perceived value and adoption of new technology of the future, autonomous vehicles, will be more diversified and demonstrated. First, optimism bias, which is a variable of increasing interest in the field of information security and health management, will be selected to analyze and verify the perceived benefits, the correlation with perceived sacrifice, the perceived value which is a dependent variable, and the impact and effect on the adoption intention.

Optimistic bias has become the subject of full-fledged academic research and discussion as it has been collectively and socially confirmed that most people are optimistic about future events, unforeseen circumstances, and events likely to occur (Taylor et al., 1992), especially those with a psychological tendency to believe that positive outcomes of the future are less likely to occur to themselves than others (Kim Bong-chul, Choi Myung-il, Lee Dong-geun, 2006). The degree of confidence in the probability of any event or situation is determined by motivational factors, namely defensive or pessimistic observations, and their importance to the subject's safety (Kim In-sook, 2012), rather than cognitive factors, while people tend to lower the probability of consequences that are against them (intentionally or unintentionally). These psychological trends or phenomena are referred to as unrealistic optimism (Weinstein, 1980), optimistic bias (Weinstein, Klein, 1994), and self-favoring bias (Hoorens, 1996). On the basis of this inner psychological bias, a vague information or uncertain situation is judged as an interpretation in one's favor (Weinstein, 1983).

So far, optimistic bias is the problem of violence in schools (Kim Bong-cheol, Choi Myung-il, Lee Dong-geun, 2006; Kim Bong-cheol, Joo Ji-hyeok, Choi Myung-il, 2009; Chapin, 2000), economic crisis of companies (Kim Bong-cheol, Lee Dong-geun, 2006), and problem of anthrax terrorism (Salmon et al., 2003). It has been studied as an important factor that affects the psychology and method of response of those involved in various fields. However, across social phenomena, it is relatively recent that optimism or self-preferential bias has begun to be used as a major variable in identifying the cognitive and psychological motives of those involved, and even after the perception of optimistic bias has spread to some extent, most studies related to optimistic bias have been concentrated in the areas of health and disease management (Koo Yoon-hee; No Ki-young, 2018; Park Hyun-jung, 2013). A previous study of optimistic prejudice suggests that the chances of developing AIDS, cancer, and various adult diseases are neglected in normal health care, or even in minor early stages of awareness, there are frequent cases of subjects whose health blindness and physical warnings are ignored (Kim Seok-il; Yang Seong-ji, 2019; Lee Seol-hee; Ham Eun-mi, 2010; Jeong Yeong-ju; Park Jin-hee, 2016; Cha Dong-pil, 2004). It is often reported that most people in the diagnosis and healing of various diseases have psychological tendencies or attitudes in which the risk of their own health are predicted to be lower than those of the same gender or others of a similar age, often resulting in the loss of the golden time of treatment (Park Soo-ho, Lee Seol-hee, Ham Eun-mi, 2008).

In addition to health and disease issues, most people who have car accidents, safety accident, disaster, and unexpected damage or negative events such as crimes are less likely to occur for them than others (Perloff), 1987). As a result, people become more traumatized in the event of damage or disaster, and there is a tendency of not being able to respond properly (Oh Mi-young, Oh Mi Sook, 2013). Especially, those who have an

optimistically low chance of occurring themselves or their families, such as a traffic accident or disaster, are generally stingy or do not feel the need for the purchase of insurance or the use of the safety system, so they tend to waste the costs associated with it (Cho Seung-ah, Kim Sang-un, 2018).

Optimism bias is often found not only in negative events but also in general and everyday events and issues.. According to Buehler et al. (1994), workers involved in work-related projects tend to be optimistic that the project will be completed in a short period of time, and this trend is higher at the beginning of the project. According to Weinstein (1980), most students are hopefully expect to own fancy homes in the future, receive higher starting salaries, and more likely to live longer than their peers (Weinstein, 1980).

In addition, optimism bias is identified not only in personal issues, but also in social and community issues such as corporate management and public health. Salmon et al. (2003) conducted a survey of Michigan-based companies in the United States, which analyzed that many of the company's executives and general employees expressed an optimistic bias that anthrax attacks will not occur in the companies to which they belong. Cooper et al. (1988) surveyed 2,994 American entrepreneurs about the company's future and chances of success, in which more than 70 percent said their companies would successfully survive. In addition, stock brokers, financial experts, and corporate crisis managers are often reported to misjudge or fail to respond well to crisis situations due to optimism bias in making significant investment judgments or economic decisions (Kim Bong-chul, Lee Dong-geun, 2006).

Recently, as new technologies, the development of new products, and the distribution of new products have become global trends and topics, there are a growing number of studies analyzing and verifying cognitive, psychological attitudes,

motivations, responses, and evaluations of general or corporate users involved in the acceptance of new technologies. In the process, attempts to analyze and discuss the effects of optimistic bias are emerging (Choi Jong-geun, Chae Myung-shin, 2016). Among them, users' optimistic prejudices in IT, digital, and mobile areas such as information security of individuals and businesses, data storage, safety of e-File systems, e-Commerce, and privacy protection in s-Commerce were mainly analyzed and discussed. First of all, Rhee et al. (2005) introduced and applied the variable of optimistic bias almost for the first time in the field of IT information protection, and the status and causes of low security awareness (unexpected) of individuals and businesses were analyzed and discussed. According to this, users, or the team they belong to, were generally perceived to have a lower risk of corporate security compared to other teams, other groups, and other companies, and it is analyzed that optimism bias has a direct impact on this complacent sense of security.

IT, digital, and mobile-related safety awareness, such as information security and personal information leakage, can also affect the perceived value and acceptance of relevant new technologies or applications. In the process, the optimistic bias about information security or privacy has a relatively negative impact on the perceived value of new technologies, new software, and applications, which is also reported to have a negative impact on the intention of acceptance and the intention of continued use. A study by Yoon Yeo-joon and Shin Dong-chun (2019), which analyzed the perceived value of newly released smartphone vaccines and variables that affect the intention of continued use, showed that the perceived benefits of new smartphone vaccines have a positive impact on perceived value and intention of continued use, while perceived sacrifice and optimism bias have negative effects. The optimistic prejudice of smartphone users who believe that the problem of smartphone information leakage or the problem of

hacking will not happen to them has proven that the value of the new technology-applied vaccine is low, leading to a negative attitude toward the purchase and use of the vaccine. The results of the analysis by Yoon Yeo-joon and Shin Dong-chun (2019) show that optimistic prejudice can have a negative impact on the intention of acceptance and use by lowering the perceived value of new technologies and new products, similar to the perceived sacrifice. In this sense, as the optimistic bias is positively correlated with the perceived sacrifice and negatively correlated with the perceived benefits, the perceived value, acceptance, and usage intentions of the new technology are expected to change.

Taking this into account, the study seeks to examine the perceived benefits of optimism bias, how they affect the perceived value of autonomous vehicles, and the intent of acceptance in a conflicting relationship to perceived sacrifice. Currently, future users' attention is focused on how successfully manned safe driving and even unmanned safe driving can be achieved while thoroughly preventing various safety accidents, and the solution of safety problems is recognized as one of the key requirements for the commercialization and popularization of autonomous vehicles. In this situation, the optimistic bias, in which the average user hopefully predicts that a safety accident in an autonomous vehicle is less likely to happen to others, is to be identified through an empirical survey of future users about how it will affect the perceived value of the autonomous vehicle and the intent of acceptance and purchase.

2.3.2 The Effects of Optimism Bias

Since Weinstein first established optimistic bias as an academic theory in the early 1980s, prior studies involving optimistic bias have been activated in various areas. Overseas studies on optimistic prejudice have been actively conducted on people's attitudes, safety awareness and risk awareness toward chronic diseases (Klein, Weinstein,

1995; Kunda, 1987; Weinstein, 1984) such as cancer, heart disease and kidney disease, as well as adult diseases, AIDS (Gold, Aucotte, 2003; Chapin, 2000; Harris, 1997), smoking (Arnett, 2000; Baker et al., 2001; Dillard et al., 2006; Han, 1997), drunk driving and various other safety accidents. In Korea, health-related studies in which optimistic prejudices have been used as variables have been dealt with in detailed areas such as cancer (Koo Yoon-hee, Noh Ki-young, 2018; Lee Dong-sook, 2003; Lee Seol-hee, Ham Eun-mi, 2010), AIDS (Kim Bong-cheol, Choi Yang-ho, Choi Myung-il, 2006; Cha Dong-pil, 2004), smoking problems (Ha Ji-young et al., 2019), and general health issues (Kim Seok-il, Yang Sung-ji, 2019; Park Soo-ho, Lee Seol-hee, Ham Eun-mi, 2008; Park Hyun-jung, 2013), and these studies have proved the different effects and effects of optimistic prejudice on people's perception and behavior in various ways. Below, we will take a look at the positive or negative effects of optimism bias on the perception, psychology, and behavior of many people.

First of all, the biggest difference between those who have a strong optimistic bias and those who don't is how they perceive and respond to risk (Dillard et al., 2006). People with high optimistic bias are vulnerable to risk awareness, which makes them negligent in their usual management of health care and safety, making them more likely to be exposed to future health risks or various disasters, contrary to their optimism bias (Weinstein, 1984). Taylor et al. (1992)'s study, which analyzed the impact of optimism bias on AIDS, also reported that people with relatively strong optimistic bias have neglected health prevention actions by underestimating their chances of developing AIDS. Radcliffe and Klein(2002)'s study, which analyzed the relationship between the risk of heart disease and optimistic prejudice, also found that people with optimistic bias have a lower risk of heart disease, less prior knowledge of heart disease, and fewer changes in their behavior or living habits even after education on risk factors for heart

disease. For people with this strong optimistic bias, it is commonly reported that efforts to manage health and prevent outbreaks are neglected due to low awareness of future risk in general health problems, as well as serious diseases such as AIDS, cancer and heart disease, and that if this is taken into account, various disease prevention education and health promotion campaigns should focus on reducing or improving people's optimism biases about health risk or the onset of disease (Ha Ji Young et al., 2019).

The optimistic bias is analyzed to have an important impact not only on the management of health and the prevention of diseases, but also on people's awareness of various safety accidents and disaster accidents, the behavior of risk prevention, or the behavior of safety awareness and safety management. Users who are optimistic about the issue of smartphone security were found to be low in both perceived value and intention of accepting and using the new vaccine (Yoon Yeo-joon, Shin Dong-cheon, 2017), and students or parents who are optimistic about the issue of school violence (i.e. students and parents who believe that school violence is unlikely to occur in themselves or their children) reported responding passively or lukewarmly to the issue of preventing and improving school violence (Kim Bong-chul, Choi Myung-il, Lee Dong-geun, 2006). According to a study by Choi Jong-geun and Chae Myung-shin (2010), which demonstrated and analyzed the impact of the attitude and psychological characteristics of information security personnel in businesses and public institutions on the security situation of information, some people were found to be optimistic about the security of information, and in that case, the security status of the information of the company or institution they belong to is more vulnerable or often problematic.

Given that optimistic bias has such a close impact on various safety, risks, disasters, accidents, health, public health, and social and public issues, it can be seen that a great deal of attention and effort must be made in each area to properly control,

manage, and overcome. Businesses and public institutions should also actively try and invest by closely monitoring the positive and negative effects of optimism bias on the general user, or consumer perception, psychology, and behavior, so that optimistic bias can be overcome and resolved in ways that benefit corporate management and society as a whole. As these points are recognized, this study also seeks to analyze and demonstrate the impact of user optimism bias on the perceived value and acceptance of autonomous vehicles.

2.4 Perceived threat

2.4.1 Meaning of perceived threat

Along with the optimistic bias, the study will draw further attention to "the perceived threat"as another variable that affects the perceived value, acceptance, and purchase intention of autonomous vehicles. Contrary to optimistic prejudice, perceived threats refer to cognitive and psychological attitudes for measures to be devised, with a sense of anxiety, fear or vigilance against any phenomena or events in the present and future, or potential dangers and threats that may occur, and negatively aware of the safety of themselves and those around them (Sohn Nan-hee, 2007). Borkovec, Alcaine and Behar (2004) referred to perceived threats as the beginning of a process of unrest. Foa, Kozak (1986), explained that there are two important attributes of perceived threats: being aware of the possibility of unwanted things happening and being aware of the consequences. In fact, most people worry about and fear the greater sacrifices and costs that will be derived after death, as well as their own impact on unfortunate events, disasters, and accidents in the present or in the future (Roemer, Molina, Borkovec, 1997).

It can be seen that the concept is contrary to the aforementioned optimistic prejudice because perceived threats are cognitive and psychological tendencies that

become anxious and afraid of future situations, potential risks, and possible accidents or diseases. People who feel more sensitive to perceived threats tend to suffer from anxiety in everything, as they feel that unfortunate accidents or disasters, health deterioration or serious illness, and unexpected accidents are more likely to happen to themselves or people around them than others (Dugas et al., 1998). Perceived threats in this sense are explained to be closely related to anxiety sensitivity both medically and psychologically (Reiss, McNally, 1985). People who perceive exceptionally highly for anxiety sensitivity usually write it off as unlucky or unpleasant and become much more sensitive and seriously obsessed with signals or signs that can be taken lightly, and they are worried in advance in anticipation of harmful consequences or adverse effects in the near future (Hwang Sung-hoon, Yoo Hee-jung, Kim Hwan, 2001).

People who are strongly aware of perceived threats or anxiety sensitivity seek solutions when they are in vague information, uncertain situations, or events, interpreting and judging them in ways that are disadvantageous or threatening to them (Amir, Beard, 2004). In other words, people with a high degree of perceived threat have a pessimistic and serious tendency to accept vague information, situation, or event as a sign of unhappiness, as a serious risk, or as a threat is stronger than that of the general public (Tallis, Davey, Capuzzo, 1994). This is exactly in contrast to the optimistic prejudice that judges and hopefully interprets vague and uncertain information, events, or situations in their favor.

It can be seen that the perceived threat with this meaning is a similar concept to the "Threat Apraisal" presented by the "Protection Motivation Theory." Threat assessment refers to a personal and subjective assessment of the level of risks posed by current or future threatening events or situations, and those who are particularly recognized and evaluated by situations or events around them will actively seek ways to

solve or respond to problems in order to protect themselves (Rogers, 1983). Rogers, which first organized the protection motivation theory, explained that the threat assessment caused most people to take the act of protection to protect their safety or health, which defined the threat assessment as one of the motivations for protection (Park Chan-wook, Lee Sang-woo, 2014). Considering the fact that motivations for protection to protect themselves exist and act on the psychological basis or basis of perceived threats, the aspects and consequences of the development of perceived threats can be more reasonably understood and explained.

Optimism bias and perceived threats tend to contradict each other, but this can be seen to most people as a slight or at the same time an inherent attribute. General and average people can react sensitively and carefully to uncertain situations or potential threats of events, as they have an optimistic tendency to interpret and judge surrounding situations or events to their advantage, as well as a defensive motivation to protect themselves from a possible threat or risk (Jang Han-jin, No Gi-yeong, 2020). However, depending on the individual, there may be differences in degree or importance, such as strong optimism bias or special awareness of perceived threats.

As this is considered, this study shows that optimism bias, perceived benefits by adding perceived threats to new independent variables, and along with perceived sacrifices, the impact on the perceived value and acceptance intent of autonomous vehicles will be analyzed and verified in a variety of ways. Contrary to the optimistic bias, perceived threats induce awareness of the safety of autonomous vehicles and the malfunction of the system much more sensitively and threateningly, leading to lower awareness of the value of autonomous vehicles and is expected to have a negative impact on the intention of use or purchase. This can also be closely linked to the motivation for protection to protect oneself from accidents caused by autonomous vehicles. Thus,

reducing or eliminating the average user's perceived threats will enhance the perceived value of autonomous vehicles and promote the acceptance intention and purchase intention.

Through the selection and design of such variables as above, the study aims to establish theoretical and practical guidelines and references to help the commercialization and popularization of autonomous vehicles by dividing them into positive (knowledged benefits, optimistic prejudice) and negative aspects (knowledged sacrifices, perceived threats) that affect the perceived value and acceptance of autonomous vehicles, a representative new technology that will lead the Fourth Industrial Revolution.

2.4.2 The component of perceived threats

Perceived threats have recently been increasingly utilized not only in the areas for the prevention of various disasters and accidents, but also in the areas of health management and disease prevention (Joo Ji-hyeok, 2017). Studies that used perceived threats as analytical variables were composed of sub-factors of perceived threats according to the subject and design of the study. In this regard, Nemcek (1990) subdivided them into "perceived susceptibility" and "perceived severity" by identifying perceived threats as important variables that affect changes in behavior related to the health of individuals.

He demonstrated and analyzed the positive effects of perceived threats and sub-factors, perceived vulnerability, and perceived severity, on the behavior of preventive health based on the "Health Belief Model" proposed by Kirscht (1983). A health belief model is an analytical model that predicts that the belief or expectation that one's health can be improved can lead to active and autonomous healthcare behavior, which can result

in health improvement, and explains that perceived threats to the state of one's health can be strongly motivated by healthcare behavior (Becker, Maiman, 1980).

The meaning of two subfactors of perceived threats proposed and defined by Nemcek (1990) is as follows. First, perceived vulnerability is a state in which you are perceived to have vulnerable parts of the body, vulnerability, and risk factors that are susceptible to a particular disease. Second, the perceived severity refers to a state of awareness of how serious the consequences will be when affected by a particular disease or when the disease is left untreated. In other words, the perceived vulnerability is a perception of the poor conditions, vulnerabilities, and disadvantages of the current situation or system in which future threats or risks are likely to occur, and the seriousness perceived is a perception of the severity and severity of the consequences when a threat or risk actually occurs (Joo Ji-hyeok, 2017).

To sum up, perceived vulnerabilities are associated with the causes of perceived threats, and perceived severity can be seen as a factor closer to the consequences of perceived threats.

As the meaning of the previously perceived threat was explained, the evaluation of the threat of the protection motivation theory was considered together with a similar concept. Rogers (1983), who advocated the protection motivation theory, also suggested vulnerability and severity as a detailed component of the threat subject to individual evaluation and cognition. "Susceptibility" and "vulnerability" are similar terms, so it can be seen that the threats analyzed and explained in the two preceding studies, or the meaning and composition of perceived threats are logically and conceptually similar.

As the above studies are referenced, in this study, perceived threats will be broken down into two sub-factors of perceived vulnerability and perceived severity, which will demonstrate their impact on the perceived value and acceptance of autonomous vehicles.

Nemcek(1990)'s proposed perceived threat, and its subfactors, perceived vulnerability and perceived severity, were concepts related to individual health problems, and the study seeks to apply them to autonomous vehicles, the subject of analysis, to manipulatively define "the systemic problems of autonomous vehicles (which have not yet been fully resolved) and resulting accidents, such as threats perceived by general users, perceived vulnerabilities, and perceived severity." In addition, the perceived vulnerability will be defined as "the perception of systemic vulnerability, imperfection, and anxiety that causes the possibility of an accident in an autonomous vehicle," and the perceived severity will be defined as the "seriousness of the damage, loss, and seriousness of an accident actually caused by an autonomous vehicle." Newly tailored to this study's theme, and based on a perceived threat and an understanding of perceived vulnerability and perceived severity, this study will look at the perceived threats posed by future potential users and buyers of autonomous vehicles (the perceived vulnerability and perceived severity) and the correlation between perceived benefits, the underlying independent variable of the Value-Based Adoption Model, and perceived sacrifice.

CHAPTER III:

METHODOLOGY

3.1 Overview of the Research Problem

While the model of the study becomes a tool for objective and rational perception and analysis of scientific phenomena, it also becomes a useful criterion for the phenomenon to be interpreted and explained effectively (Lee Eun-soo, Cho Jae-beom, 2016). Therefore, the design of the research model is a prerequisite for scientific research, and the design of the research model can be said to be a basic and essential process in the study of various subjects in the field of social science (Heo Myung-hoe, 2010).

Chapter 2: With reference to various discussions on the theoretical background, a model of a study such as Figure 3.1 was designed for the relationship between independent variables in this study (the perceived benefits, perceived sacrifices, optimism bias, perceived threats) and dependent variables (the perceived value, intent of acceptance).

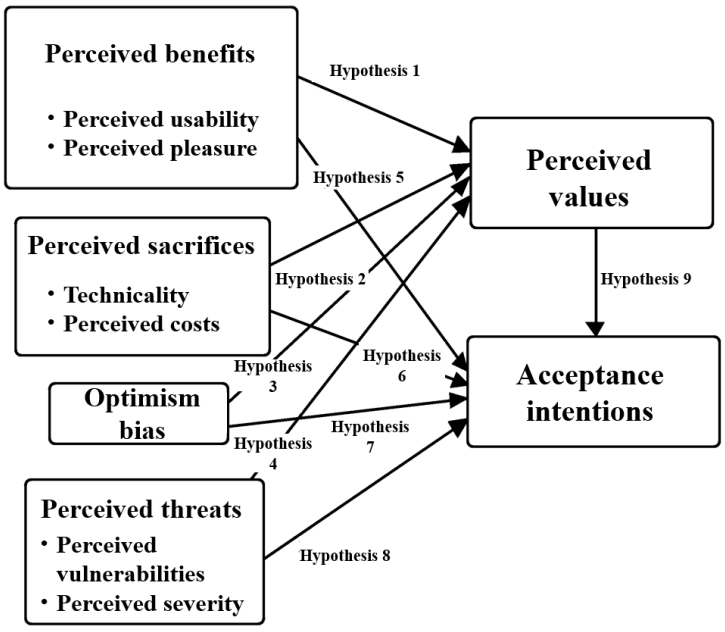

Figure 3. 1
Model of research

3.2 Operationalization of Theoretical Constructs

The term "operational definition of a variable" means the general and universal definition of all objects or phenomena being compressed into content, form, and scope that can be observed and measured in the activities of research (Chae Seo-il, Kim Joo-young, 2017).

For example, A dictionary of perceived benefits, And the ambiguity of the subject is that the general definition is literally applied to professional research in social or natural sciences, The difficulty of setting the range, And it's not possible because of the difficulty of setting the direction of the study, Among the various details and elements that constitute perceived benefits, observation is tailored to the need and purpose of research, Measurement, Analysis, And then certain elements that we can discuss can be isolated and extracted, There must be a clear 'methodological definition'of what concepts and methods it will be used in research (Jung Doo-bae, 2012). As this is considered, in this study, the contents and meanings of major variables were conducted as "operational definition," as follows, in order for the measurement, demonstration, and analysis work necessary to verify the hypothesis and derive the results to be carried out more scientifically and reasonably.

3.2.1 Perceived benefit

First of all, Kwon Hyeok-in said about the first independent variable of this study, the perceived benefit, Kim Hyun Kyung, Jeong Sun-gyu (2016), Kim Yong-hee (2016), Jung In-gu, Son Jo-gi, Yoon Seong-jun (2020), Hyun Hyo-won (2020), Kim, Chan, and studies such as Gupta (2007) are referred to indirectly, through the process of purchasing and using autonomous vehicles, individual users are cognitive, and it became 'operationally defined' with the usability and joy of psychological perception and other

various conveniences and benefits. Individual users who are aware of the various value and usability, pleasure, and the degree to which they are beneficial to their daily lives and work provided by autonomous vehicles are expected to have the motivation to actively use and buy autonomous vehicles. Thus, perceived benefits can be considered to be linked to users' cognitive and psychological responses to autonomous vehicles, as well as behavioral responses. In this sense, the study predicted that the perceived benefits would have a positive impact on the perceived value and acceptance of individual users' autonomous vehicles, and the perceived benefits based on a model of value-based acceptance were selected as the first independent variable in the study.

In addition, two sub-factors of "perceived nenefits" were adopted: "perceived usability" and "perceived pleasure," each of which became "operationally defined" as follows.

First, "perceived usability"was defined as "a state of recognizing and expecting that convenience, benefits, and help can be obtained in the course of daily life and job performance by accepting, purchasing and using autonomous vehicles."

Many previous studies have shown that the perceived utility of new technologies, services, and systems is a key variable having a positive impact on the perceived value and acceptance intent of those technologies, services, and systems (Kwon Hyeok-in, Kim Hyun-kyung, Jung Soon-kyu, 2016; Kim Min-jung, Lee Soo-beom, 2018). As they are referred to, this study will demonstrate that the perceived usability of the perceived benefits of autonomous vehicles has a significant impact on the perceived value of individual users and the acceptance intention of autonomous vehicles.

Second, "perceived pleasure" was defined as "a state in which joy, and overall satisfaction are perceived and expected in the course of daily life and the performance of duties as autonomous vehicles are accommodated, purchased and used.". A number of

previous studies have also shown that the perceived enjoyment of new technologies, services, and systems have a positive impact on the perceived value and acceptance intent of individual users (Kim Yong-hee, 2016; Jung In-gu, Son Jo-gi, Yoon Sung-joon, 2020). As they are referred to in this study, it is to prove that perceived pleasure among the perceived benefits of autonomous vehicles has a significant impact on the perceived value and the acceptance intention.

3.2.2 Perceived sacrifice

Next, the second independent variable of this study referred to studies such as Kim Min-jung, Lee Soo-beom (2018), Yoo Hoon (2018), Hyun Hyo-won (2020), Kerin et al.(1992), Kim, Chan and Gupta (2007). It was operationally defined as "technical complexity that individual users have to endure to purchase and use autonomous vehicles, time or effort to be put in, financial costs, and various other psychological and social burdens.” 'Technicality' and 'perceived cost' were adopted as the sub factors of 'perceived sacrifice,' and they were 'operationally defIned' as follows.

First, "technicality"was defined as "a variety of technical characteristics encountered in the process of acceptance, purchase, and use of autonomous vehicles, especially cognitive and psychologically burdensome technical problems or complexity, and the time, effort, and opportunity cost involved." A number of previous studies have shown that attributes associated with technology, such as the technical complexity of new technologies, services, and systems and acquisition difficulties, have a negative impact on the value and acceptance of new technologies perceived by individual users (Kim Min-jung, Lee Soo-beom, 2018; Kim Yong-hee, 2016; Hyun Hyo-won, 2020; Kim, Chan, Gupta, 2007). As they are referred to in this study, it will be verified that it has a

significant impact on the perceived value of technology and the acceptance intention among the perceived sacrifices of autonomous vehicles.

Second, 'the perceived cost'was defined as 'the monetary and financial costs to be paid in the course of the acceptance, purchase and use of autonomous vehicles and the resulting psychological burden or hesitation.' A number of previous studies have shown that new technology and the high financial or financial burden incurred in the process of accepting and purchasing new products negatively affect the purchase or use of the technology or product and put the decision on hold (Kim Yong-hee, 2016; Kim Joo-yeon, 2020; Choi Kyung-ok, Lee Hyung-ryong, 2019; Kim, Chan, Gupta, 2007). As they are referred to, this study will empirically determine whether the financial costs to be sacrificed for the purchase and use of autonomous vehicles will have a negative impact on the perceived value and the acceptance intention.

3.2.3 Optimistic bias

Next, the third independent variable in the study, studies by Kim Bong-chul, Choi Myung-il, Lee Dong-geun (2006), Kim In-sook (2012), Salmon et al.(2003), Taylor et al. (1992) and Weinstein (1984) were predicted to be optimistically low, making it a "psychological tendency or attitude to trust the safety and convenience of autonomous vehicles in favor of others." Few studies have analyzed the impact of optimism bias on the perceived value, acceptance, and intent of new technologies in the Fourth Industrial Revolution. If this study demonstrates the significant impact of optimism bias on the perceived value of autonomous vehicles, attitude of acceptance, and behavior, it will be a meaningful achievement, both theoretically and in practice.

3.2.4 Perceived threat

Next, Son Nan-hee (2007) on the fourth independent variable of this study, the perceived threat, Joo Ji-hyeok (2017), Hwang Sung-hoon, Yoo Hee-jung, Kim Hwan (2001), Amir, Beard (2004), Nemcek(1990), Roemer, Molina, And studies such as Borkovec(1997) refer to the systemic vulnerability of autonomous vehicles, and various safety accidents or disasters, such as traffic accidents that may occur due to incompleteness, etc., Potential dangers or threats, Anxiety or fear of unexpected events, etc., Appropriate measures to ensure his/her safety and the safety of people around him/her while feeling vigilant, And the cognitive desire to take precautions, and it became "operationally defined" as a 'psychological attitude.'

'Perceived vulnerability' and 'perceived severity' were adopted as sub-factors of 'cognitive threat', and they were 'operationally defineds' as follows.

First, "convenient vulnerabilities" are defined as "cognitive and psychological attitudes for appropriate preventive measures or solutions to be sought as they are perceived and wary of systemic vulnerabilities, imperfections, and anxiety that cause the possibility of accidents in autonomous vehicles."

Second, "perceived severity"is defined as "a cognitive and psychological attitude to devise a possible solution or a way to overcome as a serious damage or significant loss that may be caused when an accident caused by an autonomous vehicle is predicted in advance." To date, it is hard to find an empirical analysis of the impact of perceived threats on the perceived value, acceptance, and the intention of use by the representative new technologies of the Fourth Industrial Revolution, which is intended to provide valid theoretical and practical implications.

3.2.5 Perceived value

Next, Kim Ah-reum(2021) on the first dependent variable of this study, 'perceived value', Sung Hyun-ah (2020), Yoo Hoon (2018), Jo Ga-ryeong (2020), Kim, Chan, Gupta(2007), And Roostika(2012) and other studies refer to the various values and utility of autonomous vehicles, benefit, merit, and quality that is objective and subjectively superior, and as users are positively perceived and recognized for desirable characteristics that are good for daily life and work, it became 'a condition in which acceptance and purchase are considered positively'.

Perceived value is a psychology acquired by fully recognizing and confirming the various benefits and benefits of new technologies and new products. Because it is the start and basis of new technologies, the acceptance and choice of new products, and the intention of purchase and continuous and long-term use, it is regarded as an essential element for the successful commercialization and popularization of specific technologies or products. With this in mind, the study seeks to verify variables that affect the perceived value of autonomous vehicles through empirical surveys of users.

3.2.6 Acceptance intention

Next, Kwon Hyeok-in said about the second dependent variable of this study, Acceptance Intention, Kim Hyun Kyung, Jeong Sun-gyu (2016), Kim Yong-hee (2016), Jung In-gu, Son Jo-gi, Seong-jun Yoon (2020), Ham Sang-yeol (2017), Venkatesh et al.(2003), And Venkatesh et al.(2016) and others have indirectly referred to the state of the art, autonomous vehicles, and it has become "operationally defined" as a psychological attitude and acceptance intention favorably and purchase or rent it in the near future. The acceptance intention refers to the primary and prior intention to be accepted familiarly and autonomously in order to improve one's daily life and quality of life, with favorable recognition of the expected advantages, expected achievements, and

expected benefits of autonomous vehicles, the new technology of the future that will lead the Fourth Industrial Revolution. An individual user must recognize the intention of primary and prior acceptance of an autonomous vehicle to recognize the intention of continuous use, which is a more in-depth and follow-up variable in the next step, and translate them into real action. In this sense, whether the four independent variables looked at earlier in this study have a positive impact on the user's primary and prior acceptance of autonomous vehicles, or the intention of adoption will be examined and verified through a user demonstration survey (an explanatory survey).

3.3 Research Design

In this study, the model of the study was designed by referring to the contents of the preceding studies examined in Chapter 2 and the "fabricated definitions" of the independent and dependent variables of this study, and the following research hypotheses were set based on the model of the study that was designed.

3.3.1 Hypothesis 1 : Perceived benefits will have a statistically significant impact on perceived values.

Hypothesis 1-1 : Perceived usability among perceived benefits will have a significant impact on perceived values.

Hypothesis 1-2 : Perceived pleasure among perceived benefits will have a significant impact on perceived value.

3.3.2 Hypothesis 2 : Perceived sacrifices will have a statistically significant impact on perceived values.

Hypothesis 2-1 : Among perceived sacrifices, technicality will have a significant impact on perceived values.

Hypothesis 2-2 : Perceived costs during perceived sacrifices will have a significant impact on perceived values.

3.3.3 Hypothesis 3 : Optimism bias will have a statistically significant impact on perceived values.

3.3.4 Hypothesis 4 : Perceived threats will have a statistically significant impact on perceived values.

Hypothesis 4-1 : Perceived vulnerabilities among perceived threats will have a significant impact on perceived values.

Hypothesis 4-2 : The perceived severity of perceived threats will have a significant impact on perceived values.

3.3.5 Hypothesis 5 : Perceived benefits will have a statistically significant impact on the acceptance intention.

Hypothesis 5-1 : Perceived usability among perceived benefits will have a significant impact on acceptance intentions.

Hypothesis 5-2 : Perceived pleasure among perceived benefits will have a significant impact on acceptance intentions.

3.3.6 Hypothesis 6 : Perceived sacrifices will have a statistically significant impact on the acceptance intention.

Hypothesis 6-1 : Among perceived sacrifices, technicality will have a significant impact on acceptance intentions.

Hypothesis 6-2 : Perceived costs during perceived sacrifices will have a significant impact on acceptance intentions.

3.3.7 Hypothesis 7 : Optimism bias will have a statistically significant impact on acceptance intentions.

3.3.8 Hypothesis 8 : Perceived threats will have a statistically significant impact on acceptance intentions.

Hypothesis 8-1 : Perceived vulnerabilities among perceived threats will have a significant impact on acceptance intentions.

Hypothesis 8-2 : The perceived severity of perceived threats will have a significant impact on acceptance intentions.

3.3.9 Hypothesis 9 : Perceived values will have a statistically significant impact on acceptance intentions.

3.4 Participant Selection

In this study, the hypothesis and research model of the study were verified, and in order to achieve the research goal, an empirical survey (an explanatory survey) was conducted on general users interested in the development and operation of autonomous vehicles. The empirical survey was adopted as a sample survey conducted only by respondents who responded to the survey conducted in the study, rather than a full-scale survey conducted by all users interested in the development and operation of autonomous

vehicles. The sample survey method is an efficient way to secure meaningful results while saving time and effort to be put into the survey, and is commonly used in terms of social science (Kim Byung-wook, 2015). In this study, the purpose and method of the survey was clearly explained in advance, and as a result, self-enumeration method was used, which was written directly by the subjects of the survey (Heo Myung-hoe, 2010).

3.5 Instrumentation

The study seeks to verify the impact and causal relationship between users'perceived benefits to autonomous vehicles, perceived sacrifices, optimism bias, and perceived threats, perceived values, and intent of acceptance. In order to achieve the goals of the above study, the factors and items of detailed measures of the study's independence and dependent variables were extracted and compiled, and a questionnaire was formed to be used in the process of empirical investigation of this study.

First of all, for the measurement of perceived benefits,"the items of measurement developed and applied by Kim, Chan and Guta (2007) were revised and supplemented by Kim Yong-hee (2016) and Hyun Hyo-won (2020) according to the theme of each study and the domestic situation, and some expressions and phrases were revised and supplemented in accordance with the purpose of the study and the consciousness of the problem, and were finally selected as a total of two sub-factors and eight items." In detail, it consists of 4 items of 'cognitive usability' and 4 items of 'cognitive pleasure.'

Second, for the measure of "perceived sacrifice," the items of measurement developed and applied by Kerin et al.(1992), Kim, Chan, Guta (2007), etc. were revised and supplemented by Kim Min-jung, Lee Soo-beom (2018), Kim Joo-yeon (2020), and Yoo Hoon (2018) to suit the domestic situation. Some expressions and phrases were revised and supplemented to suit the purpose of the study and the consciousness of the

problem, and a total of two sub-factors, and seven items were finally selected. In detail, it consists of 4 items of 'technology' and 3 items of 'cognitive cost.'

Third, as items for measuring optimism bias'', the items of measurement developed and applied by Weinstein (1984) and others were revised and supplemented by Kim Bong-chul, Choi Myung-il, Lee Dong-geun (2006), and Kim In-sook (2012) to suit the domestic situation. A total of 5 items were selected as some expressions and phrases were revised and supplemented in accordance with the purpose of the study and the consciousness of the problem.''

Fourth, the measures developed and applied by Nemcek (1990) were revised and supplemented by Sohn Nan-hee (2007) and Joo Ji-hyuk (2017) to suit the domestic situation, and some expressions and phrases were revised and supplemented in accordance with the purpose of the study and the consciousness of the problem, and were finally selected as a total of two sub-factors and 8 items. In detail, it consists of 4 items of 'cognitive vulnerability' and 4 items of 'cognitive severity'.

Fifth, the items of measurement developed and applied by Kim, Chan, Guta (2007), and Roostika (2012) were revised and supplemented by Kim Ah-reum (2021), Sung Hyun-ah (2020) and Yoohoon (2018), and some expressions and phrases were revised and supplemented to suit the purpose of the study and the consciousness of the problem, and a total of 4 items were finally selected.

Sixth, the items of measurement developed and applied by Venkatesh et al.(2016) were revised and supplemented by Kwon Hyuk-in, Kim Hyun-kyung, Jung Soon-kyu (2016), and Ham Sang-yeol (2017) according to the theme of the study and the domestic situation. A total of 4 items were finally selected as some expressions and phrases were revised and supplemented to suit the purpose of the study and the consciousness of the problem.

The survey, which was finalized after the review above, consists of 10 areas: perceived usability, perceived pleasure, technicality, perceived cost, optimism bias, perceived vulnerability, perceived severity, perceived value, acceptance intention, and demographic characteristics of survey respondents.

The demographic characteristics of the survey respondents consisted of 7 categories: gender, age, residential area, final academic background, occupation, average monthly income, and marital status.

Among these, nine areas, excluding the demographic characteristics of the survey respondents, consisted of Likert-type 5-point scale (One point: Strongly disagree Two points: Disagree, Three points: Neither agree nor disagree, Four points: Agree, Five points: Strongly agree) were constructed to be measured. The equivalence scale is an efficient measure that enables diverse and professional statistical analysis along with the ratio scale. Among them, the Rickert-style 5-point scale is the most commonly used scale in most previous studies, along with the Rickert-style 7-point scale (Lee Sang-woo, 2016).

When the composition of the survey as above is summarized, it is as shown in Table 3. 1.

Table 3. 1
Composition of survey

Factor	Prior study	Measurement items	Number of Items
Perceived Usability	Kim Yong-hee (2016), Hyun Hyo-won (2020), Kim, Chan,	I think buying and using an autonomous vehicle will help my daily life and work.	4
		I think buying and using an autonomous vehicle will increase the level of my daily life and work.	

	Gupta (2007)	I think buying and using autonomous vehicle can make my daily life and work more useful and easier.	
		I think autonomous vehicles will be useful and efficient in general.	
Perceived pleasure		I think it would be pleasant to buy and use autonomous vehicles.	4
		I think autonomous vehicles will give me a lot of pleasure.	
		I think buying and using autonomous vehicles will be fun and satisfying.	
		I don't think buying and using an autonomous vehicle will make me bored.	
Technicality	Kim Min-jung and others (2018), Kim Joo-yeon (2020), Yoo Hoon (2018), Kerin et al. (1992), Kim, Chan, Gupta (2007)	I think the full implementation of autonomous vehicles will be difficult.	4
		I think it will be difficult to understand the technologies associated with the driving systems of autonomous vehicles.	
		I think it will cost a lot to improve the safety of autonomous vehicles.	
		I think it will be difficult to use an autonomous vehicle safely.	
Perceived cost		I'd be hesitant to use an autonomous vehicle if the initial purchase cost was high.	3
		If the cost of using and maintaining autonomous vehicles (material prices, maintenance costs, etc.) is high, I will likely	

		hesitate to use them.	
		I think the cost of buying and using an autonomous vehicle will be burdensome.	
Optimism bias	Kim Bong-cheol, (2006), Kim In-sook, (2012), Weinstein (1984)	I think the autonomous vehicles I will purchase and use are unlikely to occur due to problems with the performance of the system (video cameras, direction indicators, AI software, GPS, rider, remote lasers, sound wave equipment, 3D cameras, etc.).	5
		Autonomous vehicles that I will purchase and use are unlikely to cause accidents due to the vulnerability of information security and hacking of the system.	
		I think autonomous vehicles that I will purchase and use are unlikely to cause accidents due to road conditions or traffic problems.	
		The autonomous vehicles I'll buy and use are unlikely to cause accidents due to a driver's eventual misjudgment.	
		I think I'm well prepared for accidents, disasters, threats, etc. that may arise in the process of using autonomous vehicles.	
Perceived vulnerability	Son Nan-hui (2007), Joo Ji-hyeok (2017), Nemcek	I think there is a possibility of accidents caused by problems with the system of autonomous vehicles, malfunctions, etc.	4
		I'm worried about accidents caused by autonomous vehicles.	
		I find it hard to believe that autonomous	

	(1990)	vehicles are less likely to cause accidents or are safer than human-driven cars.	
		I think using an autonomous vehicle is likely to cause an accident within a few years.	
perceived severity		I think my financial stability will be threatened if an accident occurs due to an autonomous vehicle.	4
		I think my career will be threatened if an accident occurs due to an autonomous vehicle.	
		Accidents or problems caused by autonomous vehicles are thought to last (the effects) for a long time.	
		If an accident occurs due to an autonomous vehicle, I think it will be more serious than other accidents.	
Perceived value	Kim A-reum (2021), Sung Hyun-ah (2020), Yoo Hoon (2018), Kim, Chan, Gupta (2007), Rostika (2012)	I think the cost of buying and using autonomous vehicles, and the benefits for the effort will be higher.	4
		I think the cost of buying and using a autonomous vehicle, and the value you get for your effort, will be higher.	
		I think the cost of purchasing and using autonomous vehicles and the rewards you can feel compared to your efforts will be higher.	
		I think autonomous vehicles will provide high and desirable value for my daily life and work performance in general.	

Acceptance intention	Kwon Hyeok-in, Kim Hyun-kyung, Jeong Soon-gyu (2016), Ham Sang yeol(2017) Venkatesh et al. (2016)	I intend to purchase and use autonomous vehicles in the near future.	4
		I intend to continue to actively use autonomous vehicles (without leaving them out) even after purchasing them.	
		I intend to purchase and use autonomous vehicles to achieve greater satisfaction in my life.	
		I intend to purchase and use autonomous vehicles for a higher value of my life.	

3.6 Data Collection Procedures

The survey of this study was conducted in 2 stages: a preliminary survey and a main survey. The preliminary survey was commissioned by an online research institute for 5 days from Dec. 5 to Dec. 10, 2020, and 50 respondents were recruited online and conducted in summary. Through this process, after the lack of survey items and points to be supplemented in the draft were identified and revised and supplemented, the survey items to be used in the survey were finalized.

Based on the items of the newly confirmed survey (attached Table 4 and an appendix), the survey was commissioned and conducted by the same online research institute for 25 days from Jan. 5 to Jan. 30, 2021 in consideration of the equal distribution of gender and age. A total of 700 questionnaires were distributed during the survey, and 655 copies, excluding unanswered and unrecovered, were recovered first (recovery rate of 93.6%), and 602 copies of the data, excluding 53 cases of poor answers,

misinterpretation of the contents of the questions, or lack of reliability of the answers, were confirmed to be subject to the final analysis (86% final firm rate).

3.7 Data Analysis

The study was used by the SPSS Stats 21.0 Statistical Package Program to analyze the data from the final confirmed survey and to verify the hypothesis. The method of analyzing the data used in this study is as follows.

First, frequency analysis was performed on the demographic characteristics of respondents in the survey. The analysis of frequency is a method of a survey of basic statistics to determine the overall nature and orientation of the survey by analyzing and organizing the overall property, distribution, percentage and proportion of the respondents in the survey (Seo Eui-hoon, 2018).

Secondly, descriptive statistics analysis was conducted on the independent variables in this study and the detailed measures that make up the dependent variables. The descriptive statistics analysis is a method of analyzing statistics that shows the representative value and the width of variation of the data by identifying the mean and standard deviation of the items measured (Hyunchul Choi, 2016).

Third, an analysis of exploratory factors was conducted to ensure the validity between the main variables and factors of this study. Factor analysis is an essential process for the alignment of variables and factors, to enhance the validity and correlation between the underlying factors that constitute each variable, and to remove factors that do not match the results of the previous study, which primarily enhances the composition validity and relevance of each variable and factor (Kim Hee-nyeon, 2013).

Fourth, reliability analysis was conducted to examine the internal consistency of the subfactors that make up the independent variables and dependent variables of this

study. The reliability of independent and dependent variables consists of stability, predictability, accuracy, and consistency, and factors in the detailed composition of independent and dependent variables are analyzed and verified whether these specific properties are met (Yoo Jin-eun, 2015). In this study, reliability coefficients of Chronoch's Alpha were utilized for reliability verification.

Fifth, a correlation analysis was conducted between all the subfactors that make up the independent and dependent variables of this study. A correlation analysis is a task in which the strength of the primary correlation between the variables and each subfactor or item of the measurement is measured, and through the analysis of the correlation between the items of the measurement, the direction and degree of the results of the analysis can be predicted in advance, and the organizational validity and consistent direction of the measurement can also be identified (Lee Hee-yeon, Noh Seung-chul, 2013). The study used the Pearson Correlation Coefficient during the analysis of correlation.

Sixth, a simple regression analysis and multiple regression analysis were conducted to verify the hypotheses of the study, in which the causal relationships and effects between independent and dependent variables have been demonstrated. Simple regression analysis is a method of analysis in which the impact and causal relationship between the independent variables of the singular and the dependent variables of the singular are verified. Multiple regression analysis is a method of analysis in which multiple independent and singular, or the impact and causal relationship between multiple dependent variables are verified (100th day, 2013). A singular variable means a single variable without a subfactor, and a multiple variable means a complex variable in which one variable includes two or more factors. As this study explains, for example, perceived benefits, an independent variable, consist of two factors, perceived utility and perceived

pleasure, which is a multiple factor, and the intention of acceptance, a dependent variable, is a singular variable because there is no sub factor.

CHAPTER IV:

RESULTS

4.1 Analysis of Demographic Characteristics of Respondents

As a basic work for empirical analysis of this study, The demographic characteristics of respondents in the survey subject to empirical surveys are gender, age, final education, jobs, average monthly income, residential area, residential type, and form of residence, and then the frequency analysis was conducted by dividing it into 9 categories of marital status, The result has been arranged in Table 5. If the main results of the frequency analysis are summarized, the following is as follows.

First of all, the gender was analyzed as 327 men (54.26%), and 275 women (45.74%).

It was analyzed that 195 people in their 20s (32.39%), 215 people in their 30s (35.71%), 98 people in their 40s (16.28%), 53 people in their 50s (8.8%), and 41 people in their 60s and older (6.81%).

If you look at residential areas, 192 residents of Seoul (31.91%), 26 residents of Gangwon (4.26%), 195 residents of Gyeonggi (32.45%), 22 residents of Gyeongnam (3.72%), Ten residents of Gyeongbuk (1.6%), 13 residents of Gwangju (2.13%), Ten residents of Daegu (1.6%), 26 residents of Daejeon (4.26%), 16 residents of Busan (2.66%), Three residents of Ulsan (0.53%), 38 residents of Incheon (6.38%), 13 residents of Jeollanam-do (2.13%), 16 residents of Jeonbuk (2.66%), Three residents of Jeju (0.53%), Six residents of Chungnam (1.06%), and it was analyzed as 13 residents of Chungbuk (2.13%).

The final academic background was analyzed as 83 high school graduates (13.83%), 131 college graduates (21.81%), 298 four-year college graduates (49.47%), 64 graduates from graduate school or higher (10.64%), and 26 others (4.26%).

If you look at the job, 61 self-employed workers (10.11%), 26 technical and work workers (4.26%), 195 office and technical workers (32.45%), 29 sales and sales service workers (4.79%), Thirty-two management and management officials (5. 32%), 29 free and professional (4. 79%), Nine persons engaged in agriculture, forestry, fisheries, and livestock industries (1.6%), 84 college students and graduate students (13. 83%), 80 housewives (13.3%), 29 civil servants (4. 79%), 9 unemployed people (1. 57%), and it was analyzed as 19 other people (3.19%).

The average monthly income amounted less than 200 million won to 75 people (12.46%), 201 to 3 million won to 180 people (29.90%), 3.01 to 4 million won to 167 people (27.74%), 401 to 5 million won to 93 people (15.45%), 501 to 6 million won to 55 people (9.14%) and 6.01 million won to 32 people (5.32%).

Whether married or not was analyzed as 417 married people (69.27%), and 185 unmarried people (30.73%).

Table 4. 1
Demographic characteristics of survey respondents

Variable	Detailed group	Number of people	Percentage(%)
Sex	Man	327	54.26
	Woman	275	45.74
Age	20s	195	32.39
	30s	215	35.71
	40s	98	16.28
	50s	53	8.8
	Over 60s	41	6.81
Residential Area	Seoul	192	31.91
	Gangwon	26	4.26

	Gyeonggi	195	32.45
	Gyeongnam	22	3.72
	Gyeongbuk	10	1.6
	Gwangju	13	2.13
	Daegu	10	1.6
	Daejeon	26	4.26
	Busan	16	2.66
	Ulsan	3	0.53
	Incheon	38	6.38
	Jeonnam	13	2.13
	Jeonbuk	16	2.66
	Jeju	3	0.53
	Chungnam	6	1.06
	Chungbuk	13	2.13
Final education	High school	83	13.83
	Junior college	131	21.81
	4-year college	298	49.47
	Above graduate school	64	10.64
	Etc.	26	4.26
Occupation	Self-employment	61	10.11
	Technical and work jobs	26	4.26
	Office and technical jobs	195	32.45
	Sales and Sales services	29	4.79
	Management	32	5.32
	Free, profession	29	4.79

	Agriculture, forestry, fishing, and livestock industries	9	1.6
	College students and graduate students	84	13.83
	Full-time housewife	80	13.3
	Public official	29	4.79
	Unemployed	9	1.57
	Etc.	19	3.19
Average monthly income	Less than 2 million won	75	12.46
	201~3 million won	180	29.90
	301~4 million won	167	27.74
	401~5 million won	93	15.45
	501~6 million won	55	9.14
	Over 6.01 million won	32	5.32
Marital status	Married	417	69.27
	Single	185	30.73

4.2 Analysis of Descriptive Statistics of Measurement

In this study, a descriptive statistical analysis was conducted on the detailed measures of a number of factors that make up independent and dependent variables, and the results were organized through tables 6 to 14. Technical statistics are a basic indicator in which the overall distribution of collected data and the direction of information are

known, and the analysis of technical statistics is the most frequently and fundamentally utilized analysis in the analysis of statistics along with the analysis of frequency.

Table 4. 2
Descriptive statistics of measured items for 'Perceived usability'

No.	Measurement items	Mean	Standard deviation
1	I think it will help my daily life and work if autonomous vehicles are purchased and used.	3.90	0.858
2	I think the level of my daily life and work will be even higher if autonomous vehicles are purchased and used.	3.69	0.897
3	I believe that when autonomous vehicles are purchased and used, my daily lives and tasks can become more useful and easier to operate.	3.79	0.914
4	I think autonomous vehicles will be useful and efficient in general.	3.53	0.910

Table 4. 3
Descriptive statistics of metrics for 'Perceived Pleasure'

No.	Measurement items	Mean	Standard deviation
1	I think it would be pleasant for autonomous vehicles to be purchased and used.	3.58	0.697
2	I think autonomous vehicles will provide me with a lot of joy.	3.59	0.869
3	I think it will be fun and satisfying for autonomous vehicles to be purchased and used.	3.54	0.868

4	I don't think buying and using autonomous vehicles will make me bored.	3.67	0.724

Table 4. 4
Descriptive statistics of metrics for 'Technicality'

No.	Measurement items	Mean	Standard deviation
1	I think full technical implementation of autonomous vehicles will be difficult.	3.23	0.903
2	I think it will be difficult to understand the technology involved in the driving systems of autonomous vehicles.	3.11	0.891
3	I think it will cost a lot to improve the safety of autonomous vehicles.	3.08	0.884
4	I think it will be difficult to use a autonomous vehicle safely.	3.10	0.862

Table 4. 5
Descriptive statistics of metrics for 'Perceived Costs'

No.	Measurement items	Mean	Standard deviation
1	I think the high cost of early purchases of autonomous vehicles will likely lead to a reluctance to use them.	3.77	0.620
2	If the cost of using and maintaining autonomous vehicles (material prices, maintenance costs, etc.) is high, I think it will be hesitant to use them.	3.62	0.588
3	I think the cost of autonomous vehicles being paid to be purchased and used will be burdensome.	3.92	0.685

Table 4. 6
Descriptive statistics of the metrics for 'Optimistic Bias'

No.	Measurement items	Mean	Standard deviation
1	The autonomous vehicles I will purchase and use are thought to be less likely to occur due to problems with the performance of the system (video cameras, direction indicators, AI software, GPS, ridar, remote lasers, sound wave equipment, 3D cameras, etc.).	3.21	0.669
2	Autonomous vehicles I will purchase and use are thought to be less likely to cause accidents due to the security vulnerability of information and hacking of systems.	3.07	0.656
3	Autonomous vehicles that I will purchase and use are thought to be less likely to cause accidents due to road conditions or traffic problems.	3.23	0.659
4	The autonomous vehicle I will purchase and use is thought to be less likely to cause an accident due to a driver's final misjudgment.	3.38	0.609
5	I think we're well prepared for accidents, disasters, threats, etc. that may arise in the course of the use of autonomous vehicles.	3.06	0.736

Table 4. 7
Descriptive statistics of metrics for 'Perceived Vulnerabilities'

No.	Measurement items	Mean	Standard deviation
1	I think there is a possibility of accidents caused by problems with the system of autonomous vehicles,	2.72	0.962

	malfunctions, etc.		
2	I'm worried about accidents caused by autonomous vehicles.	2.46	1.077
3	I find it hard to believe that autonomous vehicles are less likely to cause accidents or safer than human-driven cars.	2.62	1.034
4	I think it's likely that autonomous vehicles will cause accidents within a few years if they're used.	2.48	1.058

Table 4. 8
Descriptive statistics of metrics for 'Perceived Severity'

No.	Measurement items	Mean	Standard deviation
1	I think my financial stability will be threatened if an accident occurs due to an autonomous vehicle.	2.87	0.674
2	I think my career will be threatened if an accident occurs due to an autonomous vehicle.	2.81	0.678
3	I think accidents or problems caused by autonomous vehicles will continue for a long time (the impact).	2.61	0.657
4	If an accident occurs due to an autonomous vehicle, I think it will be more serious than other accidents.	2.93	0.637

Table 4. 9
Descriptive statistics of metrics for 'Perceived Values'

No.	Measurement items	Mean	Standard deviation
1	I think the cost that autonomous vehicles are put in to be purchased and used, and the benefits they can get	3.94	0.956

	compared to the effort will be higher.		
2	I think autonomous vehicles will be put in for purchase and use, and the value you can get for the effort will be higher.	3.49	1.138
3	I think it's the cost that will be put into buying and using autonomous vehicles, and I think it will be more rewarding compared to the effort.	3.40	1.120
4	I think autonomous vehicles will bring high and desirable value to my daily life and work performance in general.	3.34	1.120

Table 4. 10
Descriptive statistics of metrics for 'Acceptance Intention'

No.	Measurement items	Mean	Standard deviation
1	I intend that autonomous vehicles will be purchased and used in the near future.	3.71	0.989
2	I intend to continue to actively use autonomous vehicles (without leaving them out) even after they are purchased.	3.83	0.870
3	I intend that autonomous vehicles will be purchased and used to achieve greater satisfaction in my life.	3.34	1.097
4	I intend that autonomous vehicles will be purchased and used for a higher value in my life.	3.44	1.039

4.3 Verification of the Validity and Reliability of Measurement

In this study, two types of verification were conducted to prove whether the empirical data collected through the process of the survey had scientific and objective

meaning. First, a "validity" verification was conducted to determine whether the collected data accurately measured the independence and dependent variables of this study. Second, a 'reliable' verification was conducted to determine whether it was properly measured so that no error was included in the process of measuring each variable.

4.3.1 Verification of feasibility

According to a number of prior studies, validity is an indicator of how accurately the variables to be measured are measured (Jang Sung-hwa et al., 2016). The validity is divided into content validity, criterion-related validity, and construct validity depending on the method of evaluation (Kwon Yong-man, Jang In-hong, Lee Dong-soo, 2017). Content validity is the way in which the representation of the tool of the measure is measured, and if some of the many attributes of the measure are representatively measured and measured, the tool of the measure is considered valid (Seo Eui-hoon, 2018).

Criterioan-related validity is to identify statistical relationships between certain variables (Ko Jong-wook, Ryu Chul, 2011).

Construct validity is a concept related to the accuracy of the measurement itself, which relates to what the tool of the measure is actually measured or whether the abstract concept the investigator wants to measure is actually properly measured (Jung Woo-suk, Son Il-kwon, 2010).

In this study, validity verification was carried out with the construct validity at the center. As a method of extracting subfactors for verifying feasibility, Primary Components Analyses (PCA) was used, and the method of varimax, a right-angle rotation, was chosen. In general, in the field of social science, if the eigen-value of

subfactors consisting of independent and dependent variables is 1.0 or higher, it is considered a statistically significant variable.

Also, if the 'factor loading value'which shows the degree of correlation between sub-factors is 0.4 or higher, it is regarded as a statistically significant variable and more than 0.5 is judged as an important variable (Song Ji-joon, 2015; Chae Seo-il, 2016). According to this standard, the validity of each variable was determined based on eigen-value 1.0 or higher and factor loading value 0.4 or higher.

The results of the validity study on the independent and dependent variables of this study are summarized as Table 4.11 to Table 4.16.

Table 4. 11
Validity test results for 'Perceived Benefits'

Factor	Variable	Factor load	eigen-value	Variance (%)	Cumulative Variance(%)
Perceived Usability	I think that when autonomous vehicles are purchased and used, they will help my daily life and work.	0.905	3.538	44.224	44.224
	I think the level of my daily life and work will be even higher if autonomous vehicles are purchased and used.	0.913			
	I believe that when autonomous vehicles are purchased and used, my daily lives and tasks can become more useful and easier to operate.	0.915			

	I think autonomous vehicles will be useful and efficient in general.	0.876			
Perceived Pleasure	I think it would be pleasant for autonomous vehicles to be purchased and used.	0.899	3.351	41.888	86.112
	I think autonomous vehicles will give me a lot of pleasure.	0.945			
	I think it will be fun and satisfying for autonomous vehicles to be purchased and used.	0.919			
	I don't think the purchase and use of autonomous vehicles will make me bored.	0.947			

According to table 4. 11 above, the unique values of the first independent variables of this study, the sub-factors that make up the perceived benefits, were 3.538 and 3.351, and the factor loading value was between 0.876 and 0.947, with an intrinsic value of 1.0 or higher, and a factor loading value of 0.4 or higher. It can therefore be confirmed that perceived benefits are statistically significant. In addition, the total explanatory power caused by the variance of perceived benefits is a cumulative 86.112%, and the composition of factors of perceived benefits can be seen as valid and appropriate. In general, in the field of social science, the validity and appropriateness of factors are determined based on 60% of the total variance (Kwak Ki-young, 2017).

Table 4. 12
Validity test result of 'Perceived Sacrifice'

Factor	Variable	Factor load	eigen value	Variance (%)	Cumulative Variance(%)
Technicality	I think the full implementation of autonomous vehicles will be difficult.	0.912	3.601	51.442	51.442
	I think it will be difficult to understand the technologies involved in the system of driving autonomous vehicles.	0.940			
	I think it's going to cost a lot to improve the safety of autonomous vehicles.	0.958			
	I find it difficult for autonomous vehicles to be used safely.	0.944			
Perceived Cost	I think the high cost of early purchases of autonomous vehicles will likely lead to a reluctance to use them.	0.829	2.179	31.130	82.572
	If the cost of using and maintaining autonomous vehicles (material prices, maintenance costs, etc.) is high, I think it will be hesitant to use them.	0.801			

	I think the cost of autonomous vehicles being paid to be purchased and used will be burdensome.	0.847			

As shown in Table 4.12, the unique value of one of the independent variables of this study, the sub-factors consisting of the perceived sacrifice, is 3.601 and 2.179, the factor loading is 0.801 ~ 0.958, and the total explanation by variance is 82.572%, so the composition of the variable can be considered appropriate.

Table 4. 13
Results of validity test for 'Optimistic Bias'

Factor	Variable	Factor load	Eigen value	Variance (%)	Cumulative Variance(%)
Optimistic bias	The autonomous vehicles I will purchase and use are considered unlikely to occur due to problems with the performance of the system (video cameras, directional indicators, AI software, GPS, rider, remote lasers, sound wave equipment, 3D cameras, etc.).	0.820	3.104	62.079	62.079
	Autonomous vehicles that I will purchase and use are unlikely to cause accidents due to the vulnerability of information security and hacking	0.765			

	of systems.				
	Autonomous cars that I will purchase and use are unlikely to cause accidents due to road conditions or traffic problems.	0.784			
	Autonomous vehicles I purchase, and will use, are considered unlikely to cause accidents due to the driver's eventual misjudgment.	0.777			
	I think I'm well prepared for accidents, disasters, threats, etc. that may arise in the process of using autonomous vehicles.	0.793			

According to Table 4.13, the unique value of one of the dependent variables of this study, the measurement consisting of optimistic bias, is 3.104, the factor loading is 0.765 ~ 0.820, and the total explanation due to variance is 62.079%.

Table 4. 14
Validity test result of 'Perceived Threat'

Factor	Variance	Factor loading	Eigen value	Variance (%)	Cumulative variance(%)
perceived vulnerability	I think there is a possibility of accidents caused by problems with the system of autonomous vehicles, malfunctions, etc.	0.809	3.196	39.953	39.953

	I'm worried about accidents caused by autonomous vehicles.	0.918			
	I find it hard to believe that autonomous vehicles are less likely to cause accidents or safer than human-driven cars.	0.818			
	I think using an autonomous vehicle is likely to cause an accident within a few years.	0.914			
perceived severity	I think my financial stability will be threatened if an accident occurs due to an autonomous vehicle.	0.855	2.718	33.974	73.927
	I think my career will be threatened if an accident occurs due to an autonomous vehicle.	0.813			
	Accidents or problems caused by autonomous vehiclces are thought to last for a long time (the effects).	0.727			
	It is thought that accidents caused by autonomous vehicles will be more serious than other accidents.	0.783			

As shown in Table 18, the intrinsic value of one of the independent variables of this study, the sub-factors that make up the perceived threat, is 3.196, 2.718, the factor loading value is 0.727 ~ 0.918, and the total explanation by variance is 73.927%, and the composition of the variable can be considered appropriate.

Table 4. 15
Validity test result of 'Perceived Values'

Factor	Variable	Factor load	Eigen value	Variance (%)	Cumulative variance(%)
Perceived value	I think the cost that autonomous vehicles are put in to be purchased and used, and the benefits they can get compared to the effort will be higher.	0.863	3.235	80.878	80.878
	I think autonomous vehicles will be higher than the cost they are put in to be purchased and used, and the value they can can be gotten for the effort.	0.885			
	I think that autonomous vehicles will be put in to be purchased and used, and that it will be more rewarding compared to the effort.	0.940			
	I think autonomous vehicles will provide high and desirable value for my daily life and work performance in general.	0.908			

Table 4. 16
Validity test result on 'Adoption Intentions'

Factor	Variable	Factor load	Eigen value	Variance (%)	Cumulative Variance(%)
Adoption Intention	I intend that autonomous-driving cars will be purchased and used in the near future.	0.804	2.823	70.569	70.569
	I intend to continue to actively use autonomous-driving cars (without leaving them out) even after purchasing them.	0.805			
	I intend that autonomous-driving cars will be purchased and used to achieve greater satisfaction in my life.	0.880			
	I intend that autonomous-driving cars will be purchased and used for a higher value in my life.	0.868			

According to Table 4. 15, the intrinsic value of one of the dependent variables of this study, the measurement consisting of the perceived value, is 3.235, the factor loading value is 0.863 ~ 0.940, and the total explanation power by variance is 80.878%. Also, according to Table 4. 16, the intrinsic value of the measurement, of which one of the subordinate variables of this study, which is the intention of acceptance, is 2.823, the factor loading is 0.804~0.880, and the total explanation power by variance is 70.569%.

4.3.2 Verification of reliability

Reliability means the degree to which there is no error in the outcome of the measurement (Kwak Ki-young, 2017). In the process of independent varialbe and the less the number of detailed items that make up the dependent variable are measured, the results of the measurement are assessed to be reliable, and synonyms for reliability include stability, consistency, predictability, and accuracy (Song In-sik, 2018). Methods in which reliability is evaluated include parallel verification method, re-verification method, internal matching method, and Cronbach's Alpha, and the Cronbach's Alpha technique is most widely used in social science (Chae Gu-muk, 2014).

If the Cronbach's Alpha coefficient of all items that constitute a single variable is 0.5 or higher, and if the Cronbach's Alpha coefficient of each item is 0.9 or higher, it is considered highly reliable (Noh Hyung-jin, Jeong Han-yeol, 2007). In social science, a Chronobach's Alpha value of 0.6 or higher is generally considered reliable (Song Ji-joon, 2015).

As a result of verifying the reliability of the variables measured in this study, Cronbach's Alpha of all variables, as shown in Table 4. 17, was calculated between 0.6 and 0.8 to ensure their reliability.

Table 4. 17
Results of verification on reliability of variables

Variable	Factor	Number of items	Reliability
Perceived benefit	Perceived usability	4	0.934
	Perceived pleasure	4	0.953
Perceived sacrifice	Technicality	4	0.968
	Perceived cost	3	0.792
optimism bias		5	0.846

Perceived threat	perceived vulnerability	4	0.915
	perceived severity	4	0.840
Perceived value		4	0.920
Acceptance intention		4	0.860

4.4 Summary of Findings

Above, the validity and reliability of the independent variables, dependent variables, and subfactors that make up each of these studies have been verified. Next, an analysis of the correlation between the independent variables of this study, and all the subfactors that make up the dependent variables, was performed. An analysis of a correlation is a task in which the strength of the primary relationship between each variable and its subfactor, or metric is measured, and through the analysis of the correlation between variables, factors, and items, the direction and degree of the outcome of the analysis can be predicted in advance, and each variable, factor, and the consistent orientation of the item can also be identified (Lee Hee-yeon, Noh Seung-chul, 2013). Therefore, the analysis of statistics and the process of demonstration must be performed as a key procedure of variables, factors, and items.

In general, correlation analysis in the field of social science is widely used by the Pearson Correlation Coefficient, and according to this standard, variables based on the assumption that the probability of significance p is less than 0.05, and if the correlation coefficient between the factors is ±0.7 ~ ±0.9, the correlation is very strong, ±0.4 ~ ±0.7 has a relatively strong correlation, ±0.1 ~ ±0.4 is interpreted as weak correlation (Jang Sung-hwa, Lee Ju-yeon, Lee Hyo-ja, Choi Sung-yeol, Choi Eun-hee, Hwang Yoon-mi, 2016). On the other hand, if the probability of significance p is 0.05 or higher, it is interpreted that there is no significant correlation. Positive number is represented by

positive correlation, and negative number is represented by negative correlation (Choi Hyun-chul, 2016).

The results of the analysis of the correlation between the independence and the main sub-factors that make up the dependent variables of this study are shown in Table 4. 18.

Table 4. 18
Analysis result of correlation between major factors

	Perceived usability	Perceived pleasure	Technicality	Perceived Cost	Optimism bias	perceived vulnerability	perceived severity	Perceived value	Acceptance intention
Perceived usability	1								
Perceived pleasure	0.322**	1							
Technicality	-0.260**	-0.352**	1						
Perceived Cost	-0.441**	-0.428**	0.371**	1					
Optimism bias	0.386**	0.371**	-0.223**	-0.381**	1				
perceived vulnerability	-0.357**	-0.430**	0.240**	0.416**	-0.274**	1			
perceived severity	-0.398**	-0.494**	0.213**	0.425**	-0.243**	0.472**	1		
Perceived value	0.603**	0.494**	-0.446**	-0.556**	0.448**	-0.411**	-0.465**	1	
Acceptance intention	0.502**	0.487**	-0.427**	-0.552**	0.418**	-0.389**	-0.464**	0.631**	1

** p<.05 ** p<.01*

4.5 Conclusion

As a result of the analysis of the correlation, it was analyzed that the correlation of 21 pairs out of 36 pairs were distributed between ±0.4 ~ ±0.7, and the correlation of 15 pairs was distributed between ±0.2 ~ ±0.4. From this, it can be confirmed that the correlation and validity between the variables and factors of this study have been ensured, and that the direction of the hypothesis of the study and the design of the model of the study has been properly established.

CHAPTER V:

DISCUSSION

5.1 Overview of Results

A hypothesis was set in this study to identify perceived benefits, perceived sacrifice, optimism bias, perceived threats and perceived values, and the effects of acceptance and cause and effect, with hypothesis 1-9 to be demonstrated and identified, and simple and multiple regression analyses were carried out to be verified.

5.2 Discussion of Research Question One

Hypothesis 1 : Perceived benefits will have a statistically significant impact on perceived values.

Hypothesis 1-1 : Perceived usefulness among perceived benefits will have a significant impact on perceived values.

Hypothesis 1-2 : Perceived pleasure among perceived benefits will have a significant impact on perceived values.

The results of the multiple regression analysis for hypothesis 1 to be verified are as shown in Table 5. 1.

Table 5. 1
The result of multiple regression analyses of perceived benefits, and perceived values.

Classification	Unstandardized Coefficients		Standardized Coefficient	t	Significance probability	Collinearity statistics	
	B	Standard deviation	β			Tolerance	VIF
(Constant)	-0.240	0.171		-1.403	0.161		

Perceived usability	0.590	0.038	0.495	15.674	0.000**	0.897	1.115
Perceived pleasure	0.440	0.041	0.335	10.615	0.000**	0.897	1.115
R squared=0.464, adjusted R squared=0.462, F=259.503, df1=2, p=0.000, Durbin-Watson=2.030							

*Dependent variable : Perceived value. * p<0.05, ** p<0.01*

First of all, the total explanatory power (Adjusted R squared value) that the perceived benefit, which is an independent variable, have for the perceived value which is a dependent variable is 46.2%, the F statistics value for the variance analysis is 259.503, the significance probability p is 0.000, and the Durbin-Watson value is 2.030. The contents and methods of interpretation of the regression model, or their main figures that prove the validity of regression, are as follows.

First of all, the R squared value, or adjusted R-Squared, represents an explanation for the dependent variable of an independent variable, and the standard of appropriateness is not constant for each preceding study, but if both numbers are negative or the difference between the two figures is large, the corresponding regression model is considered inadequate (Park Joon-sung, So Yong-jun, 2017).

In general, in multiple regression analysis, the adjusted R squared value is displayed, and the simple regression analysis shows the R squared value (Park Kwang-bae, 2016), the difference between the R squared value of this regression model and the modified R squared value is not significant, and the modified R squared value is good, so the validity of this regression model can be proven (Kwak Ki Young, 2017). Next, if the probability of significance for the distributed analysis value F is less than 0.05, the corresponding regression model can be interpreted as appropriate. In addition, in

regression analysis, the independence of residual (the difference minus the average of the entire measured value from each measurement) should be met, and the figure this represents is the Durbin-Watson value, and if this value is close to 2, the residual independence is secured and the regression model is considered valid (Moon Su-baek, 2017). Therefore, this regression can be found to be statistically meaningful and valid due to the proper calculation of the revised R squared value, the F value of the variance analysis and the probability p, and the Durbin-Watson value.

Meanwhile, in multiple regression analysis, which consists of multiple independent variables, 'multi-collinearity' should be removed or thinned down, and multi-collinearity means that there is a very strong correlation between multiple independent variables (Ko Jong-wook, Ryu Chul, 2011). If there is multi-collinearity (i.e., if the correlation between multiple independent variables is too strong), the problem of multi-collinearity must be solved in order for the validity of multiple regression analysis to be ensured (Kim Ho-jung, Heo Jeon, 2013). Multi-collinearity is generally identified through the Variance Inflation Factor (VIF) value, and if the value is below 10.0, there is considered to be no multi-collinearity problem (Chaemuk, 2014). This regressive VIF value is 1.115 (<10.0), so the multi-collinearity problem has been solved.

When the validity of this regression was ensured, and the results of multiple regression analysis between the perceived value, perceived usability and perceived pleasure, the two sub-factors that make up the perceived benefits, were all found to have a statistically significant impact on the perceived value.. In other words, the β value, the standardized coefficient of perceived usefulness, is 0.495 (p=0.000), and the β value, the standardized coefficient of perceived pleasure, is calculated at 0.335 (p=0.000), and all of these factors have been proven to have a statistically significant positive effect on each perceived value.

Thus, hypothesis 1 and its detailed hypotheses 1-1, 1-2, etc. were all adopted.

5.3 Discussion of Research Question Two

Hypothesis 2 : Perceived sacrifices will have a statistically significant impact on perceived values.

Hypothesis 2-1 : Among perceived sacrifices, technicality will have a significant impact on perceived values.

Hypothesis 2-2 : Perceived costs among perceived sacrifices will have a significant impact on perceived values.

The results of the multiple regression analysis for hypothesis 2 to be verified are as shown in Table 5. 2.

Table 5. 2
The result of multiple regression analysis on perceived sacrifice and perceived value

Classification	Unstandardized Coefficients)		Standardized Coefficients	t	Significance probability	Collinearity Statistics	
	B	Standard deviation	β			Tolerance	VIF
(Constant)	7.677	0.228		33.621	0.000		
Technicality	-0.321	0.040	-0.279	-8.019	0.000**	0.862	1.159
Perceived cost	-0.831	0.064	-0.452	-13.019	0.000**	0.862	1.159
R squared=0.376, adjusted R squared=0.374, F=180.422, df1=2, p=0.000, Durbin-Watson=2.203							

*Dependent variable : Perceived value. * $p<0.05$, ** $p<0.01$*

According to Table 5. 2, the overall explanatory power (adjusted R squared value) of the perceived value of the perceived sacrifice is 37.4%, the F statistic value is 180.422, the significance probability is 0.000, the Durbin-Watson value is 2.203, and the VIF value is 1.159 (<10.0). Therefore, there is a statistical significance in this regression, and the problem of multicollinearity has been solved.

As a result of multiple regression analysis between the perceived sacrifice and the perceived value, the two sub-factors of the perceived sacrifice, and the perceived cost, were all found to have a statistically significant impact on the perceived value. In other words, the β value, the standardized coefficient of technology, is calculated at -0.279 (p=0.000), and the β value, the standardized coefficient of the perceived cost, is calculated at -0.452 (p=0.000), and all of these factors have been proven to have a statistically significant positive effect on each perceived value.. Thus, hypothesis 2 and its detailed hypotheses, 2-1 and 2-2, were all adopted..

5.4 Discussion of Research Question Three

Hypothesis 3 : Optimism bias will have a statistically significant impact on perceived values.

The results of the simple regression analysis for hypothesis 3 to be verified are as shown in Table 5. 3. The overall explanatory power (R squared value) for perceived values of optimism bias is 19.9%, F statistic value is 150.519, significance probability is 0.000, and Dubin-Watson value is 2.058. Therefore, this regression is statistically significant. As a result of simple regression between optimistic bias and perceived values, the β value, the standardization coefficient of optimistic bias, was calculated at 0.448

(p=0.000), proving to have a statistically significant positive impact on the perceived value. Hypothesis 3 has therefore been adopted.

Table 5. 3
The result of a simple regression analysis of optimism bias and perceived values

Classification	Unstandardized coefficient		Standardized coefficient	t	Significance probability	Collinearity statistic	
	B	Standard deviation	β			Tolerance	VIF
(Constant)	0.887	0.219		4.045	0.000		
Optimistic bias	0.832	0.068	0.448	12.269	0.000**	1.000	1.000

R squared=0.201, adjusted R squared=0.199, F=150.519, df1=1, p=0.000, Durbin-Watson=2.058

*Dependent variable : perceived value. * p<0.05, ** p<0.01*

5.5 Discussion of Research Question Four

Hypothesis 4 : Perceived threats will have a statistically significant impact on perceived values.

Hypothesis 4-1 : Perceived vulnerabilities among perceived threats will have a significant impact on perceived values.

Hypothesis 4-2 : The perceived severity of perceived threats will have a significant impact on perceived values.

The results of the multiple regression analysis for hypothesis 4 to be verified are as shown in Table 5. 4. First of all, the overall explanatory power (adjusted R squared value) for the perceived value on which the perceived threat is a dependent variable is

26.1%, the F statistic value of the variance analysis is 107.359, the significance probability p is 0.000, the Durbin-Watson value is 2.035, and the VIF value is 1.286 (<0.0). Therefore, this regression is statistically significant, and the problem of multicollinearity has also been solved. Looking at perceived threats and the results of multiple regression analysis between perceived values, perceived vulnerability and perceived severity, the two subfactors that constitute perceived threats, were all found to have a statistically significant impact on perceived value. In other words, the β value, the standardized coefficient of perceived vulnerability, is -0.247 (p=0.000), and the β value, the standardized coefficient of perceived severity, is calculated at -0.349 (p=0.000), and all of these factors have been proven to have a statistically significant positive effect on each perceived value.. Thus, hypothesis 4 and its detailed hypotheses 4-1, 4-2, etc. were all adopted.

Table 5. 4
The result of multiple regression analyses on perceived threats and perceived values

Classification	Unstandardized Coefficients		Standardized Coefficients	t	Significance probability	Collinearity statistic	
	B	Standard deviation	β			Tolerance	VIF
(Constant)	5.969	0.180		33.116	0.000		
perceived vulnerability	-0.261	0.042	-0.247	-6.208	0.000**	0.778	1.286
Perceived severity	-0.626	0.071	-0.349	-8.778	0.000**	0.778	1.286

R squared=0.264, adjusted R squared=0.261, F=107.359, df1=2, p=0.000, Durbin-Watson=2.035

*Dependent variable : perceived value. * p<0.05, ** p<0.01*

5.6 Discussion of Research Question Five

Hypothesis 5 : Perceived benefits will have a statistically significant impact on the acceptance intention.

Hypothesis 5-1 : Perceived usefulness among perceived benefits will have a significant impact on acceptance intentions.

Hypothesis 5-2 : Perceived pleasure among perceived benefits will have a significant impact on acceptance intentions.

The results of the multiple regression analysis for hypothesis 5 to be verified are as shown in Table 5. 5.

Table 5. 5
The result of multiple regression analyses on perceived benefits and adoption intentions

Classification	Unstandardized Coefficient		Standardized Coefficient	t	Significance probability	Collinearity statistic	
	B	Standard deviation	β			Tolerance	VIF
(Constant)	0.628	0.160		3.924	0.000		
Perceived usability	0.396	0.035	0.385	11.241	0.000**	0.897	1.115
Perceived pleasure	0.411	0.039	0.363	10.603	0.000**	0.897	1.115

R squared=0.370, adjusted R squared=0.368, F=175.888, df1=2, p=0.000, Durbin-Watson=2.000

*Dependent variable : Acceptance intention. * $p<0.05$, ** $p<0.01$*

First of all, if the results of the multiple regression analysis between the perceived benefits and the acceptance intention are viewed, the overall explanatory power (adjusted R squared value) that the perceived benefit has for the acceptance intention is 36.8%, the statistic value of the regression is 175.888, the probability is 0.000, the Durbin-Watson value is 2,000, and the VIF value is 1.15(<10.0). Therefore, this regression is statistically significant, and the problem of multicollinearity has also been solved. The analysis found that perceived usability and perceived pleasure, the two sub-factors that constitute perceived benefits, all have a statistically significant impact on the acceptance intention. In other words, the β value, the standardized coefficient of perceived usability, is calculated at 0.385 (p=0.000), and the β value, the standardized coefficient of perceived pleasure, is calculated at 0.363 (p=0.000), and all of these factors have been proven to have a statistically significant positive effect on the acceptance intention. Thus, hypothesis 5 and its detailed hypotheses 5-1, 5-2, etc. were all adopted.

5.7 Discussion of Research Question Six

Hypothesis 6 : Perceived sacrifices will have a statistically significant impact on acceptance intention.

Hypothesis 6-1 : Among perceived sacrifices, technicality will have a significant impact on acceptance intention.

Hypothesis 6-2 : Perceived costs during perceived sacrifices will have a significant impact on acceptance intention.

The results of the multiple regression analysis to verify hypothesis 6 are as shown in Table 5. 6.

Table 5. 6
The result of multiple regression analyses on perceived sacrifice and acceptance intentions

Classification	Unstandardized Coefficient		Standardized Coefficient	t	Significance probability	Collinearity statistic	
	B	Standard deviation	β			Tolerance	VIF
(Constant)	7.102	0.199		35.684	0.000		
Technicality	-0.256	0.035	-0.257	-7.320	0.000**	0.862	1.159
Perceived cost	-0.722	0.056	-0.457	-12.992	0.000**	0.862	1.159
R squared=0.362, adjusted R squared=0.360, F=169.805, df1=2, p=0.000, Durbin-Watson=2.043							

*Dependent variable : Acceptance intention. * p<0.05, ** p<0.01*

According to Table 5. 6, the overall explanatory power (adjusted R squared value) of the perceived sacrifice on the acceptance intention is 36.0%, the F statistic value that verifies the statistical significance of regression is 169.805, the significance probability is 0.000, the Durbin-Watson value is 2.043, and the VIF value is 1.159(<0.0).. Therefore, this regression is statistically significant, and the problem of multicollinearity has also been solved.

As a result of the analysis, technicality and perceived costs, the two sub-factors that constitute perceived sacrifices, were all found to have a statistically significant impact on the acceptance intention.. In other words, the β value, the standardized coefficient of technology, is -0.257 (p=0.000), and the β value, the standardized coefficient of the perceived cost, is calculated at -0.457 (p=0.000), and all of these factors have been proven to have a statistically significant positive effect on the acceptance intention.

Thus, hypothesis 6 and its detailed hypotheses, 6-1, 6-2, were all adopted.

5.8 Discussion of Research Question Seven

Hypothesis 7 : Optimism bias will have a statistically significant impact on acceptance intentions.

The results of the simple regression analysis for hypothesis 7 to be verified are as shown in Table 5. 7. The overall explanatory power (R square value) for the acceptance intention of optimistic bias is 17.3%, F statistic value is 126.756, significance probability is 0.000, and Dubin-Watson values is 1.946. Therefore, this regression is statistically significant. As a result of simple regression between optimistic bias and acceptance intentention, the β value, the standardized coefficient of optimistic bias, was calculated at 0.418 (p=0.000) and found to have a statistically significant positive impact on the acceptance intention.

Thus, hypothesis 7 has been adopted.

Table 5. 7
The result of a simple regression analysis between optimism bias and acceptance intentions

Classification	Unstandardized coefficient		Standardized coefficient	t	Significance probability	Collinearity statistic	
	B	Standard deviation	β			Tolerance	VIF
(Constant)	1.446	0.192		7.527	0.000		
Optimism bias	0.669	0.059	0.418	11.259	0.000**	1.000	1.000

R squared=0.174, adjusted R squared=0.173, F=126.756, df1=1, p=0.000, Durbin-Watson=1.946

*Dependent variable : acceptance intention. * p<0.05, ** p<0.01*

5.9 Discussion of Research Question Eight

Hypothesis 8 : Perceived threats will have a statistically significant impact on acceptance intentions.

Hypothesis 8-1 : Perceived vulnerabilities among perceived threats will have a significant impact on acceptance intentions.

Hypothesis 8-2 : The perceived severity of perceived threats will have a significant impact on acceptance intentions.

The results of the multiple regression analysis for hypothesis 8 to be verified are as shown in Table 5. 8. First, if the results of the multiple regression analysis between the perceived threat and acceptance intentention are looked, the overall explanatory power (adjusted R squared value) that the perceived threat has for the acceptance intention is 25.0%, the F statistics value verifying the statistical significance of the regression is 101.182, the significance probability is 0.000, the Durbin-Watson value is 1.984, and the VIF value is 1.286 (<10.0). Therefore, this regression is statistically significant, and the problem of multicollinearity has also been solved.. The analysis found that perceived vulnerability and perceived severity, the two sub-factors that constitute perceived threats, all have a statistically significant impact on the acceptance intention. In other words, the β value, the standardized coefficient of perceived vulnerability, is -0.219 (p=0.000), and the β value, the standardized coefficient of perceived severity, is calculated at -0.361 (p=0.000), and all of these factors have been proven to have a statistically significant positive impact on the acceptance intention.

Thus, hypothesis 8 and its detailed hypotheses, 8-1, 8-2, were all adopted.

Table 5. 8
The result of multiple regression analyses on perceived threats and acceptance intentions

Classification	Unstandardized coefficient		Standardized coefficient	t	Significance probability	Collinearity statistic	
	B	Standard deviation	β			Tolerance	VIF
(Constant)	5.658	0.157		36.143	0.000		
Perceived vulnerability	-0.199	0.037	-0.219	-5.457	0.000**	0.778	1.286
Perceived severity	-0.558	0.062	-0.361	-9.012	0.000**	0.778	1.286

R squared=0.253, adjusted R squared=0.250, F=101.182, df1=2, p=0.000, Durbin-Watson=1.984

*Dependent variable : acceptance intention. * p<0.05, ** p<0.01*

5.10 Discussion of Research Question Nine

Hypothesis 9 : Perceived values will have a statistically significant impact on acceptance intentions.

The results of the simple regression analysis for hypothesis 9 to be verified are as shown in Table 5. 9.

Table 5. 9
The result of a simple regression analysis on perceived values and acceptance intentions

Classsification	Unstandardized coefficient		Standardized coefficient	t	Significance probability	Collinearity statistic	
	B	Standard deviation	β			Tolerance	VIF
(Constant)	1.653	0.100		16.484	0.000		

Perceived value	0.544	0.027	0.631	19.943	0.000**	1.000	1.000
R squared=0.399, adjusted R squared=0.398, F=397.713, df1=1, p=0.000, Durbin-Watson=2.048							

*Dependent variabvle : acceptance intention. * p<0.05, ** p<0.01*

Total explanatory power (R squared value) for perceived value acceptance intention is 39.8%, F statistic value is 397.713, significance probability is 0.000, and Dubin-Watson value is 2.048. Therefore, this regression is statistically significant. As a result of simple regression between the perceived value and the acceptance intention, the β value, the standardized coefficient of the perceived value, was calculated at 0.631 (p=0.000), which was found to have a statistically significant positive impact on the acceptance intention. Hypothesis 9 has therefore been adopted.

5.11 Discussion of Results

Table 5. 10 is shown when the total results of the analysis and verification of hypothesis 1-9 of this study are summarized..

Hypothesis	Detailed hypothesis	Result
Hypothesis 1	Perceived benefits will have a statistically significant impact on perceived values.	Adopted
	Hypothesis 1-1 : Among perceived benefits, perceived usefulness will have a significant impact on perceived values.	Adopted
	Hypothesis 1-2 : Perceived pleasure among perceived benefits will have a significant impact on perceived values.	Adopted
Hypothesis 2	Perceived sacrifices will have a statistically significant impact on perceived values.	Adopted

	Hypothesis 2-1 : Among perceived sacrifices, technicality will have a significant impact on perceived values.	Adopted
	Hypothesis 2-2 : Perceived costs among perceived sacrifices will have a significant impact on perceived values.	Adopted
Hypothesis 3	Optimism bias will have a statistically significant impact on perceived values.	Adopted
Hypothesis 4	Perceived threats will have a statistically significant impact on perceived values.	Adopted
	Hypothesis 4-1 : Perceived vulnerabilities among perceived threats will have a significant impact on perceived values.	Adopted
	Hypothesis 4-2 : The perceived severity of perceived threats will have a significant impact on perceived values.	Adopted
Hypothesis 5	Perceived benefits will have a statistically significant impact on acceptance intentions.	Adopted
	Hypothesis 5-1 : Perceived usability among perceived benefits will have a significant impact on acceptance intentions.	Adopted
	Hypothesis 5-2 : Perceived pleasure among perceived benefits will have a significant impact on acceptance intentions.	Adopted
Hypothesis 6	Perceived sacrifices will have a statistically significant impact on acceptance intentions.	Adopted
	Hypothesis 6-1 : Among perceived sacrifices, technicality will have a significant impact on acceptance intentions.	Adopted
	Hypothesis 6-2 : Perceived costs during perceived sacrifices will have a significant impact on acceptance intentions.	Adopted
Hypothesis 7	Optimism bias will have a statistically significant impact on acceptance intentions.	Adopted
Hypothesis 8	Perceived threats will have a statistically significant impact on acceptance intentions.	Adopted
	Hypothesis 8-1 : Perceived vulnerabilities among perceived threats	Adopted

	will have a significant impact on acceptance intentions.	
	Hypothesis 8-2 : The perceived severity of perceived threats will have a significant impact on acceptance intentions.	Adopted
Hypothesis 9	Perceived values will have a statistically significant impact on acceptance intentions.	Adopted

As a result of these simple and multiple regression analyses, the hypothesis 1-9 of this study has all been proven statistically significant. In other words, it was verified and proven that perceived benefits and optimism bias among the four independent variables in this study have a statistically significant positive impact on dependent variables, perceived values, and the acceptance intention, and that perceived sacrifices and perceived threats have significant negative effects, respectively.

CHAPTER VI:

SUMMARY, IMPLICATIONS, AND RECOMMENDATIONS

6.1 Summary

This study was conducted to derive theoretical and practical guidelines to help successfully commercialize and popularize autonomous vehicles by empirically identifying the cognitive and psychological variables of individual users that affect the perceived value and acceptance intent of autonomous vehicles, which will be a key technology in the era of the Fourth Industrial Revolution. To summarize the results of this study, it is as follows.

First, the perceived benefits of autonomous vehicles have proven to have a statistically significant positive impact on perceived values. Thus, Hypothesis 1 was adopted, and the detailed hypotheses of Hypothesis 1, 1-1, and 1-2 were all statistically significant.. As a result of multiple regression analysis between the perceived benefits and the perceived value, the β value, the standardized coefficient of perceived utility among the two sub-factors of perceived benefits, was calculated at 0.495 (p=0.000), and the β value, the standardized factor of perceived pleasure, was calculated at 0.335 (p=0.000), and both sub-factors were found to have a significant positive effect on the perceived value respectively.

Among the two factors, perceived usability is analyzed to have a greater impact on perceived value than perceived pleasure, which can be interpreted as more important than the perceived pleasure and satisfaction of autonomous vehicles, and situations that are meaningfully beneficial to their daily lives and tasks can be interpreted as more important.

As a result of the above analysis, it is proven that new technologies and the perceived benefits of new products have a positive effect on the perceived value of users.

Studies such as Yoo Hoon (2018), Cho Ga-ryeong (2020), Hyun Hyo-won (2020), Kim, Chan, Gupta (2007, Schierz et al. (2010), and Shin (2009)) are supported. Depending on the new technology and the degree of benefits acquired and perceived by the user in the process of using the new product creates a positive emotion and favorable perception of the new technology and the new product, which leads to perceived value (Lee et al., 2011; Sweeney, Soutar, 2001). This study demonstrates that the perceived benefits of autonomous vehicles are also an essential factor in the formation and deepening of perceived value.

Through this, the study sought to propose a strategy to help the commercial and industrial success of autonomous vehicles by analyzing users' perceptions and attitudes that could have a significant impact on the development and commercialization of new technologies in the future, while further demonstrating the theoretical validity and analytical usefulness of Value-Based Adoption Models.

Second, the perceived sacrifice of autonomous vehicles has proven to have a statistically significant positive impact on perceived values. Thus, hypothesis 2 was adopted, and the detailed hypotheses of hypothesis 2, 2-1, and 2-2 were both statistically significant.. As a result of a multiple regression analysis between the perceived sacrifice and the perceived value, the β value, the standardized coefficient of the technical value of the two sub-factors of the perceived sacrifice, was -0.279 (p=0.000), and the β value, the standardized coefficient of the perceived cost, was -0.452 (p=0.000), and all two subfactors were found to have a negative effect on the perceived value.

Among the two types of factors, perceived costs were analyzed to have more negative effects on perceived value than technicality. Based on this, it can be interpreted that the higher the financial cost or financial burden individual users have to pay for autonomous vehicles to be purchased or used, the more negatively the value of

autonomous vehicles. If users are more concerned and concerned about the perceived value of autonomous vehicles, companies, industries, and organizations that manufacture and supply autonomous vehicles will need to do their best to reduce users' financial burden by minimizing the cost of purchase and use as well as the technology level and safety of autonomous vehicles.

The results of this analysis proved that the perceived sacrifices of new technologies and new products have a negative impact on the perceived value of users, which was proved by studies of Lee Soo-beom (2018), Kim Yong-hee (2016), Yoo Hoon (2018), Jo Ga-ryeong (2020), Hyun Hyo-won (2020), Petrick(2002), Kim, Chan, Gupta(2007), Lee et al. (2015).

Third, optimistic bias about the possible occurrence of accidents in autonomous vehicles has proven to have a statistically significant positive impact on perceived value, and thus hypothesis 3 was adopted.

As a result of simple regression between optimistic and perceived values, the β value, the standardized coefficient of optimistic bias, was calculated at 0.448 (p=0.000), which was found to have a significant positive impact on the perceived value. Psychological tendencies or attitudes, which optimistically predict that accidents that may be caused by partial defects or imperfections in autonomous vehicles will at least not happen to them, have been shown to enhance users' perceived value of autonomous vehicles.. In other words, instead of having little or little consideration of the issue of the safety of autonomous vehicles, optimistic users can perceive and focus more on the expected benefits, expected usability, and the convenience and enjoyment of autonomous vehicles, so that the overall value of autonomous vehicles can be interpreted as being valued and judged more than others. In this sense, optimism bias can be identified as

having a positive impact on the perceived value of autonomous vehicles, similar to perceived benefits.

These results are thought to have academic and practical significance as it is almost the first case-analysis study that empirically identifies the relationship between the perceived value of advanced new technology and optimistic bias related to the Fourth Industrial Revolution.. The optimistic bias has been used primarily to verify the impact on ordinary citizens' behavior in the areas of health problems, safety accidents, natural disasters, information security, public violence (school violence), and dangerous facilities (nuclear power), and the study confirms that optimism bias can have a significant impact on new technologies such as autonomous vehicles. The results of this study can be seen to provide valid strategic guidelines for future autonomous vehicle manufacturers to make proper marketing use of optimistic and self-referential biases about individual users' expectations of autonomous vehicles and safety concerns.

Fourth, perceived threats to autonomous vehicles have proven to have a statistically significant negative impact on perceived values. Hypothesis 4 was therefore adopted, and the detailed hypotheses of Hypothesis 4, 4-1 and 4-2, were all statistically significant.. As a result of a multiple regression analysis between the perceived threat and the perceived value, the β value, the standardized factor of the perceived vulnerability of the two sub-factors of the perceived threat, was -0.247 ($p=0.000$), and the β value, the standardized factor of perceived severity, was -0.349 ($p=0.000$), and both sub-factors were found to have a significant negative effect on the perceived value.. Among the two types of factors, perceived severity was analyzed to have a stronger negative impact on perceived value than perceived vulnerability. In other words, it can be confirmed that individual users are more aware of safety issues or accident threats caused by autonomous vehicles, and that they are more concerned and afraid of actual damage, loss,

and impact (acknowledged vulnerability) than the causes of threats such as technical vulnerability and systemic insecurity (acknowledged vulnerability).

Therefore, companies in which autonomous vehicles are developed and produced should make a generous effort to develop safe autonomous driving technology to ensure that users' perceived vulnerabilities, the severity of accidents, the fear, and anxiety sensitivity caused by them are fully resolved, as well as thorough quality verification and disclosure, transparent interactive communication with users, and sharing of information to ensure that user trust and brand value are acquired. As with the optimism bias, a study analyzing the impact on the attitude or intent of the Fourth Industrial Revolution is currently hard to be found, and it can be seen that this study demonstrates the impact of perceived threats on the perceived value of autonomous vehicles, providing a more pluralistic and in-depth explanation of users' cognitive and psychological attitudes toward acceptance of new technologies..

Fifth, the perceived benefits of autonomous vehicles have been proven to have a statistically significant positive impact on users' willingness to accept autonomous vehicles. Hypothesis 5 was therefore adopted, and the detailed hypotheses of Hypothesis 5, 5-1 and 5-2, were all proven to be significant. As a result of a multiple regression analysis between the perceived benefits and the acceptance intention, the beta value, the standardized coefficient of perceived usability among the two sub-factors of perceived benefits, was 0.385 ($p=0.000$), and the beta value, the standardized coefficient of perceived pleasure, was 0.363 ($p=0.000$), and all two sub-factors were found to have a significant positive effect on the acceptance intention, respectively. Among the two factors, it was analyzed that perceived usability has a more positive impact on the acceptance intention as well as perceived value than perceived pleasure. Through this, it can be confirmed that individual users are related to the issue of whether an autonomous

vehicle is accommodated or purchased, and that the actual usability and value of everyday life and work, and the degree to which it is helpful becomes more important than perceived pleasure. These results are also consistent with the results of the analysis of the impact on the perceived value of autonomous vehicles.

Sixth, the perceived sacrifice of autonomous vehicles has proven to have a statistically significant negative impact on acceptance intentions. Thus, Hypothesis 6 was adopted, and the detailed hypotheses of Hypothesis 6, 6-1 and 6-2, were all statistically significant. As a result of a multiple regression analysis between the perceived sacrifice and the acceptance intention, among the two sub-factors, the β value, the standardized factor of the technology, was -0.257 (p=0.000), and the β value, the standardized factor of the perceived cost, was -0.457 (p=0.000), and all 2 sub-factors were found to have a significant negative effect on the acceptance intention, respectively.

Among the 2 sub-factors, perceived costs rather than technicality were analyzed to have a stronger negative impact on acceptance intentions. In other words, the higher the financial costs to be spent to accommodate, use, and maintain autonomous vehicles, the lower the user's acceptance intention, which is consistent with the results of an analysis of the impact on the perceived value.

With a comprehensive interpretation of the results of the verification of hypotheses 1, 2, 5, and 6, individual users can see that the benefits of the autonomous vehicle are greatly perceived, the more the positive expectation is raised, and the lower the sacrifice is perceived, the less the psychological burden is reduced, the higher the value of the autonomous vehicle is perceived, and it can be confirmed that the active acceptance intention is reflected.

Through this, while reaffirming the theoretical and analytical strength and validity of the Value-Based Adoption Model, it was applied to autonomous vehicles, a

representative new technology of future society, obtaining valid business implications for its successful commercialization and popularization. Since it is currently rarely found in a prior study in Korea, which analyzes individual users' perception, evaluation, and intention to accept and use autonomous vehicles, the survey, the analysis of statistics and the above discussion conducted in this study have a pioneering meaning in both academic and business. Therefore, it is hoped that the results of this analysis will be widely used as a basic reference to help the development of the autonomous vehicle industry in the future.

Seventh, optimistic bias about the possible occurrence of accidents in autonomous vehicles has proven to have a statistically significant positive impact on acceptance intention, and thus hypothesis 7 was adopted. As a result of a simple regression analysis conducted between optimistic bias and the acceptance intention, the β value, the standardized coefficient of optimistic bias, was calculated at 0.418 (p=0.000), which was found to have a positive effect on the acceptance intention. This is also in line with the results of the analysis of the impact on perceived values.

Eighth, perceived threats have been proven to have statistically significant negative effects on acceptance intentions. Hypothesis 8 was therefore adopted, and the detailed hypotheses of Hypothesis 8, 8-1, and 8-2, were all statistically significant.. As a result of multiple regression analysis between the perceived threat and the acceptance intention, the value of β, the standardized coefficient of perceived vulnerability among the two sub-factors of the perceived threat was -0.219 (p=0.000), β, the standardized coefficient of perceived severity was -0.361 (p=0.000), and both sub-factors were found to have a significant negative effect on the acceptance intention. Among the 2 sub-factors, the perceived severity has a greater negative impact on the acceptance intention

than the perceived vulnerability, which is consistent with the results of an analysis of the impact on the perceived value.

When hypotheses 7 and 8 are comprehensively interpreted, the optimism bias has the same positive effect as the perceived benefits presented in the model of value-based acceptance, while the perceived threat has proven to have a negative impact on the perceived value and the acceptance intention, similar to the perceived sacrifice, the underlying variable in the model of value-based acceptance. The conflicting optimism bias and perceived threats have been selected along with variables in the Value-Based Adoption Model, and the relationship between the perceived value of the autonomous vehicle and its impact on the acceptance intention has been demonstrated almost for the first time in Korea. In this study, more theoretical and business implications have been found and confirmed by the way in which a number of analysis models or related variables are combined and restructured, while adding examples of the expansion and application of the Value-Based Adoption Model.

It is expected that such an extended analytical model will be used as a reference to subsequent research.

Ninth, perceived values have been proven to have statistically significant positive effects on acceptance intentions, and thus hypothesis 9 has been adopted. As a result of a simple regression analysis between the perceived value and the acceptance intention, the β value, the standardized coefficient of the perceived value, was calculated at 0.631 ($p=0.000$), which was found to have a positive effect on the acceptance intention. Through this, users who are positively aware of the value of autonomous vehicles are found to have a positive attitude and commitment to the acceptance or purchase of autonomous vehicles. Therefore, by making users fully aware of the usefulness and enjoyment of autonomous vehicles, user-friendly acceptance, and high cost-to-cost

efficiency and positive value together, the intention to accommodate more autonomous vehicles will be enhanced, and through this, in order to enable the expansion, commercialization, popularization and diffusion of autonomous vehicles, we call for a great deal of attention and efforts in various fields, including the automobile industry, academia, and related organizations.

6.2 Implications

The study was analyzed based on a Value-Based Adoption Model (VAM) of cognitive and psychological variables that enable individual users' positive perception, value evaluation, and acceptance of autonomous vehicles to be promoted and deepened. Through this, it has been confirmed that in order to improve the perceived value and acceptance of autonomous vehicles, the overall usefulness and enjoyment of autonomous vehicles, low costs, safety from disasters or accidents, and other various values should be enhanced and strengthened. In other words, through the acceptance and continuous use of autonomous vehicles, the usefulness was enhanced in the process of daily life and work, and the strategic need to be encouraged and supported to feel various values, satisfaction, and self-efficacy could be confirmed.

The results of this study can be used as a valid strategic guide and basic reference for the future-oriented development of the autonomous vehicle industry and the improvement of mid- to long-term performance. In other words, the perceived usability, enjoyment, and satisfaction of autonomous vehicles will be enhanced, while the technical complexity of the acceptance process will be minimized, allowing users to make more active use of autonomous vehicles in their daily lives, and minimizing the necessary costs, technical, institutional, and policy attention, and efforts should be made to make it easier for more users to use. Such multi-faceted efforts and exploration are expected to

provide theoretical and practical guidelines and implications that the results and conclusions of this study are valid in the process of successful commercialization and popularization of autonomous vehicles.

6.3 Recommendations for Future Research

This study has the following limitations.

First, this study was adopted not by all individual users interested in autonomous vehicles, but only by those who responded to the survey. Therefore, caution must be exercised in the generalization of the results and conclusions of this study.

Second, in addition to the factors highlighted in this study, individual familiarity with IT devices, proficiency, degree of utilization, taste and enthusiasm in related programs or software, management habits of PC or IT device systems, and the usual behavior of acceptance of IT products are expected to be partially affected, but this study did not consider such individual deviations.. It is expected that more sophisticated measurement tools that can identify and demonstrate such more delicate and detailed aspects will be developed in further depth in the future..

Third, with the addition of type 2 independent variables and type 2 dependent variables based on Value-Based Adoption Models, and appropriate parameters and control variables in addition to optimistic prejudice and perceived threats, the value of the study could have been tried, but due to the researcher's time and capacity, the work could not be done.

Therefore, in subsequent studies, sample surveys will be conducted on a larger scale than this study has done, and in-depth and professional measures will need to be developed to enable more detailed, multi-faceted and diversified identification of cognitive, psychological, and behavioral variables that affect the perceived value,

acceptance, and usage intention of autonomous vehicles. It is hoped that this will lead to more meaningful research results and conclusions.

APPENDIX A

SURVEY COVER LETTER

Hello.

This survey was prepared to conduct a study on "Analysis of Factors That Influence the Acceptance of Autonomous Vehicles: Centering on Value-based Adoption Model." Your answer will be used as a valuable foundation for the study. There is no answer in this survey, so you can read the questions well and answer them honestly. It is promised that the answers will only be used as data for the analysis for which the study is intended and will never be used for other purposes. Thank you very much.

January, 2021

Swiss School of Business and Management Geneva

Minsang Yu

APPENDIX B

SURVEY GUIDE

1. Here's a question that relates to the various benefits of autonomous-driving cars you're thinking of. Please check the items that fall under 1~5 points.

1.1 It's a question of usability among the benefits of autonomous-driving cars.

(1 : Strongly disagree, 2 : Disagree, 3 : Neither agree nor disagree, 4 : Agree, 5 : Strongly agree)

	Measurement items					
1	I think that when autonomus vehicles are purchased, and used, they will benefit my daily life and work.	①	②	③	④	⑤
2	I think the level of my daily life and work will be even higher if autonomus vehicles are purchased and used.	①	②	③	④	⑤
3	I believe that when autonomous vehicles are purchased and used, my daily lives and tasks can become more useful and easier to operate.	①	②	③	④	⑤
4	I think autonomous cars are useful and efficient in general.	①	②	③	④	⑤

1.2 Here's a question about the benefits of autonomous vehicles in terms of usage pleasure. (1 : Strongly disagree, 2 : Disagree, 3 : Neither agree nor disagree, 4 : Agree, 5 : Strongly agree)

	Measurement items					
1	I think it would be pleasant for autonomous vehicles to be	①	②	③	④	⑤

	purchased and used.					
2	I think autonomous vehicles will provide me with a lot of joy.	①	②	③	④	⑤
3	I think it will be fun and satisfying for autonomous vehicles to be purchased and used.	①	②	③	④	⑤
4	I don't think it's going to make me bored that autonomous vehicles are being bought and used.	①	②	③	④	⑤

2. Here's a question about the various sacrifices you're going to have to take in order for an autonomous vehicle to be purchased or used. Please check the items that fall under 1~5 points.

2.1 It is a question relating to technical issues at the expense that will have to be taken. (1 : Strongly disagree, 2 : Disagree, 3 : Neither agree nor disagree, 4 : Agree, 5 : Strongly agree)

	Measurement Items					
1	I think the full implementation of autonomous vehicles will be difficult.	①	②	③	④	⑤
2	I think it will be difficult to understand the technologies associated with the system of driving autonomous vehicles.	①	②	③	④	⑤
3	I think it will cost a lot to improve the safety of autonomous vehicles.	①	②	③	④	⑤
4	I think autonomous vehicles are unlikely to be used safely.	①	②	③	④	⑤

2.2 It's a question of the cost of sacrifice to be taken.

(1 : Strongly disagree, 2 : Disagree, 3 : Neither agree nor disagree, 4 : Agree, 5 : Strongly agree)

	Measurement Items					
1	I think the high cost of early purchases of autonomous vehicles will likely lead to a reluctance to use them.	①	②	③	④	⑤
2	If the cost of using and maintaining autonomous vehicles (material prices, maintenance costs, etc.) is high, I think I will be hesitant to use them.	①	②	③	④	⑤
3	I think the cost of autonomous vehicles being paid to be purchased and used will be burdensome.	①	②	③	④	⑤

3. Here's the question of whether you're optimistic about the possibility of an accident in autonomous vehicles. Please check the items that fall under 1~5 points.

(1 : Strongly disagree, 2 : Disagree, 3 : Neither agree nor disagree, 4 : Agree, 5 : Strongly agree)

	Measurement Items					
1	I think the autonomous vehicles I will purchase and use are unlikely to occur due to problems with the performance of the system (video cameras, direction indicators, artificial intelligence software, GPS, lidar, remote lasers, sound wave equipment, 3D cameras, etc.).	①	②	③	④	⑤
2	I think autonomous vehicles that I will purchase and use are less likely to cause accidents due to the security vulnerabilities of information and hacking of systems.	①	②	③	④	⑤

3	I think autonomous vehiclces that I will purchase and use are unlikely to cause accidents due to road conditions or traffic problems.	①	②	③	④	⑤
4	The autonomous vehicles I'll buy and use are unlikely to cause accidents due to a driver's eventual misjudgment.	①	②	③	④	⑤
5	I think I am well prepared for accidents, disasters, threats, etc. that may arise in the process of using autonomous vehicles.	①	②	③	④	⑤

4. Here's a question about the potential threats of autonomous vehicles where you're concerned. Please check the items that fall under 1~5 points.

4.1 It's a question of vulnerability (which is the cause of the threat) among the threats of autonomous vehicles.

(1 : Strongly disagree, 2 : Disagree, 3 : Neither agree nor disagree, 4 : Agree, 5 : Strongly agree)

	Measurement Items					
1	I think there is a possibility of accidents caused by system problems, malfunctions, etc. of autonomous vehicles.	①	②	③	④	⑤
2	I'm worried about accidents caused by autonomous vehicles.	①	②	③	④	⑤
3	I find it hard to believe that autonomous vehicles are less likely to cause accidents or safer than human-driven cars.	①	②	③	④	⑤
4	I think it's likely that autonomous vehicles will cause accidents within a few years if they're used.	①	②	③	④	⑤

4.2 It's a question about the severity of the consequences of the threat of autonomous vehicles. (1 : Strongly disagree, 2 : Disagree, 3 : Neither agree nor disagree, 4 : Agree, 5 : Strongly agree)

	Measurement Items					
1	I think my financial stability will be threatened if an accident occurs due to an autonomous vehicle.	①	②	③	④	⑤
2	I think my career will be threatened if an accident occurs due to an aotonomous vehicle.	①	②	③	④	⑤
3	Accidents or problems caused by autonomous vehicles are thought to last for a long time (the effects).	①	②	③	④	⑤
4	It is thought that accidents caused by autonomous vehicles will be more serious than other accidents.	①	②	③	④	⑤

5. Here's a question about the various values of autonomous vehicles you're thinking of. Please check the items that fall under 1~5 points. (1 : Strongly disagree, 2 : Disagree, 3 : Neither agree nor disagree, 4 : Agree, 5 : Strongly agree)

	Measurement Items					
1	I think the benefits of autonomous vehicles will be higher than the costs they are put in to be purchased and used, and the benefits they can get compared to the effort.	①	②	③	④	⑤
2	I think the value of autonomous vehicles will be higher than the money they are put in to be purchased and used, and the value they can get for the effort.	①	②	③	④	⑤
3	I believe that the cost that autonomous vehicles will be put in to be purchased and used, and it will be more rewarding to feel for the effort.	①	②	③	④	⑤

4	I think autonomous vehicles will bring high and desirable value to my daily life and work performance in general.	①	②	③	④	⑤

6. Here's a question about your acceptance intentions for self-driving cars. Please check the items that fall under 1~5 points. (1 : Strongly disagree, 2 : Disagree, 3 : Neither agree nor disagree, 4 : Agree, 5 : Strongly agree)

	Measurement Items					
1	I intend that autonomous vehicles will be purchased and used in the near future.	①	②	③	④	⑤
2	I intend to continue to actively use autonomous vehicles even after they are purchased (without leaving them unattended).	①	②	③	④	⑤
3	I intend that autonomous vehicles will be purchased and used to achieve greater satisfaction in my life.	①	②	③	④	⑤

7. The following is a question related to your demographic characteristics. Please check the corresponding items or fill out the answers in parentheses..

7.1 What is your gender?

① Male ② Female

7.2 What is your age?

① 10s ② 20s ③ 30s ④ 40s ⑤ 50s ⑥ Over 60 years old

7.3 Which of the following is your residence?

① Seoul ② Gangwon ③ Gyeonggi ④ Gyeongnam ⑤ Gyeongbuk

⑥ Gwangju ⑦ Daegu ⑧ Daejeon ⑨ Busan ⑩ Ulsan ⑪ Incheon

⑫ Jeonnam ⑬ Jeonbuk ⑭ Jeju ⑮ Chungnam ⑯ Chungbuk ⑰ Others

7.4 What is your final academic background?

① Highschool ② Junior college

③ 4-year university ④ Above graduate school ⑤ Others

7.5 What is your job?

① Self-employed ② Technical and work jobs ③ Office and technical jobs

④ Sales, and Services ⑤ Management ⑥ Specialized jobs

⑦ Agriculture, forestry, fishing, and livestock industries

⑧ College students and graduate students

⑨ Full-time housewife ⑩ Public official ⑪ Unemployed ⑫ Others

7.6 What is your average monthly income? ( ) 0000 won

(* Students include pocket money, part-time job income, etc. Full-time housewives include family income)

7.7 Are you married?

① Married ② Single

◆◆ Thank you very much for accepting the survey of this study! ◆◆

REFERENCES

1. Korean Papers

Koo Yoon-hee and Noh Ki-young (2018). 자기효능감과 낙관적 편견이 유방암 검진 의도에 미치는 영향 연구(A Study of the Effects of Self-efficacy and Optimistic Bias on Breast Cancer Screening Intention : Focusing on the Health Belief Model(HBM). 사회과학연구논총(Journal of Social Sciences), 34(2), 73-109.|

Kwon Hyeok-in, Kim Hyun-kyung, and Jung Soon-kyu (2016). 신기술 혁신 모델에 기반한 3D 프린팅 산업 비즈니스 생태계 모형에 관한 연구(A Study on Ecosystem of 3D Printing Industry – Focused on Managing Technological Innovation). 정보기술아키텍처연구(Information Technology Architecture Research), 13(1), 29-41.

Kim Gyu-ok (2020). 자율주행차의 안전과 사회적 수용성 확보 방안(A plan to secure safety and social acceptance of autonomous vehicles). 월간교통(Monthly transportation), 2020(11), 6-12.

Kim Min-jung and Lee Soo-beom (2018). 외식 배달 어플리케이션 서비스 이용자의 지각된 혜택 및 희생이 지각된 가치와 행동의도에 미치는 영향(The effect of the perceived benefit and sacrifice of delivery application service users in the food industry on perceived value and behavioral intention : Using the value-based adoption model(VAM)). 관광연구저널(Tourism Research Journal), 32(2), 217-233.

Kim Bong-chul, Lee Dong-geun, (2006). 기업체 위기에 관한 낙관적 편견과 위기관리전략 수용 : 국내 300 대 기업의 위기관리 담당자를 대상으로(Optimistic Bias and Crisis Management Strategy Employment for the Corporate Crisis : Survey on the Top 300 Corporate Crisis Management

Practitioners). 한국광고홍보학회(The Korean journal of advertising and public relations), 8(2), 82-105.

Kim Bong-chul, Joo Ji-hyuk and Choi Myung-il (2009). 학교폭력에 대한 학부모들의 낙관적 편견과 예방 캠페인에 대한 탐색적 고찰 : 자아 존중감과 학교폭력 경험을 중심으로(Investigation of Parents' Optimistic Bias and Prevention Campaign Regarding School Violence). 언론과학연구(Media science research), 9(4), 65-97.

Kim Bong-cheol, Choi Myung-il, and Lee Dong-geun, (2006). 학교 폭력에 대한 낙관적 편견과 제 3 자 효과(Optimistic Bias and Third-Person Effect about School Violence). 홍보학연구(Research on public relations), 10(2), 169-197.

Kim Sang-hyun, Park Hyun-sun, and Kim Bo-ra (2020). 클라우드 컴퓨팅의 지각된 가치와 신뢰가 지속적 사용의도에 미치는 영향 : 가치기반수용모델을 기반으로(Impacts of Perceived Value and Trust on Intention to Continue Use of Individuals’ Cloud Computing : The Perception of Value-based Adoption Model). 디지털융복합연구(Journal of Digital Convergence), 19(1), 77-88.

Kim Seok-il, Yang Seong-ji (2019). 중년기 신체운동 참여자의 낙관적 편견이 지각된 건강위험과 건강증진생활양식에 미치는 영향(Effect of Optimistic Bias on Perceived Health Risk and Health Promotion Lifestyle of Middle-Aged Physical Activity Participants). 한국체육학회지(Korean journal of physical education), 58(4), 87-99.

Kim Ah-reum(2021). 로보어드바이저에 대한 금융소비자의 사용의도에 관한 연구 : 가치기반수용모델을 중심으로(A Study on the Intent of Financial Consumers on Use (2021). Robo Advisor: Value-Based Adoption Model (VAM)). Konkuk University Graduate School doctoral thesis.

Kim Yong-hee (2016). IoT 기반 스마트 홈 서비스 수용에 관한 연구 : 조건부 가치측정법과 가치기반 수용모델을 중심으로(A study on adoption of IoT smart home service : based on contingent valuation method and value-based adoption model). Soongsil University Graduate School doctoral thesis.

Kim In-sook (2012). 원자력에 대한 위험인식과 지각된 지식, 커뮤니케이션 채널의 이용, 제 3 자 효과가 낙관적 편견에 미치는 영향 일본 후쿠시마 원전사고를 중심으로(The impact of risk perception of nuclear power, perception of knowledge, the use of communication channels, the third-person effect about nuclear accident on optimistic bias -Fukushima nuclear accident). 언론과학연구(Media science research). 12(3), 79-106.

Kim Joo-yeon (2020). 가치기반수용모델(VAM)에 기초한 온라인 여행사 모바일 앱의 지각된 가치 및 수용의도에 관한 연구(Perceived Value and Adoption Intentions of the Mobile Apps in Online Travel Agency based on Value-Based Adoption Model(VAM)). 觀光硏究(Korean Journal of Tourism Research), 35(5), 25-49.

Noh Mi-jin, Park Hyun-hee, and Jang Hyung-yu (2011). 스마트의류의 지각된 가치가 신뢰와 수용의도에 미치는 영향 : 의류 가격 관여도의 조절효과를 중심으로(An Effect of the Perceived Value on the Trust and Acceptance Intention of the Smart Clothing : Moderating Effect of Price Involvement toward Clothing). 經營硏究(Journal of Business Research), 26(3), 123-147.

Dan Ryeo-ni, Jeong Cheol-ho, and Park Kyung-hye (2012). 전자상거래 환경에서 지각된 위험이 지각된 가치 및 재구매의도에 미치는 영향(The Effects of Perceived Risk Affecting Perceived Value and Repurchase Intention in Electronic Commerce Environment). 디지털융복합연구(Digital convergence research), 10(3), 13-21.|

Myung Do-hyun (2019). 자율주행시대의 안전관리체계 구축에 관한 연구(A Study on the Establishment of Safety Management System in the autonomous-driving Era). 한국융합과학회지(Korea Journal of Convergence Science). 8(4), 209-219.

Moon Ji-hyo, Lee Jong-won (2020). 전염성 질병에 따른 여행 소비자의 여행의도 결정요인에 관한 연구 : 보호동기이론을 중심으로(A Study on the Determinants of Travel Consumer's Travel Intention By Infectious Diseases: Focused on Protection Motivation Theory). 관광경영연구(Study on tourism management), 98, 239-259.

Min Kyung-deuk (2014). 3 차원 전차량 동역학 모델링 및 자율주행 시스템 설계(Three-Dimensional Full Vehicle Dynamics Modeling and Guidance Control Design for autonomous vehicle). Chungbuk National University Graduate School Doctoral Thesis.

Min Ji-sook, Lee In-ok, Kim Tae-hee (2019). 미쉐린 가이드 레스토랑의 서비스 품질이 지각된 가치, 고객만족, 행동의도에 미치는 영향 : 셰프 명성과 소비자 지식의 조절효과를 중심으로(The effect of the Service Quality of Michelin Restaurant on Perceived Value, Customer Satisfaction, and Behavioral Intention: Focus on moderating roles of chef reputation and consumer knowledge). Culinary Science & Hospitality Research, 25(5), 13-25.

Park Soo-ho, Lee Seol-hee, and Ham Eun-mi, (2008). 성인의 건강위기에 대한 낙관적 편견과 건강행위 간의 관계(The Relationship between Optimistic Bias about Health Crisis and Health Behavior). Journal of Korean Academy of Nursing, 38(3), 403-409.

Park Jung-sook (2016). 재난 위험지각이 관광행동에 미치는 영향분석 : 보호동기이론을 중심으로(The Impact of Risk Perception of Disaster on Travel

Behaviors - A focus on Protection Motivation Theory). Hanyang University Graduate School doctoral thesis.

Park Chan-wook, Lee Sang-woo, (2014). 인터넷상에서의 개인정보 보호행동에 관한 연구 : 보호동기이론을 중심으로(A study of the User Privacy Protection Behavior in Online Environment: Based on Protection Motivation Theory). 인터넷정보학회논문지(Journal of Internet Computing and Services), 15(2), 59-71.

Park Hyun-jung (2013). 질병 예방 행동 촉진을 위한 커뮤니케이션 메시지 전략 연구 : 심리적 거리, 해석수준, 이득-손실 프레임, 낙관적 편견을 중심으로(Study of the strategy of communication messages to promote behavior in the prevention of disease: Focusing on psychological distance, interpretation level, profit-loss frame, and optimism bias). Kyung Hee University Graduate School doctoral thesis.

Bae In-ho (2019). 온라인 맛집에 대한 지각된 위험이 브랜드 신뢰 및 가치, 구전효과에 미치는 영향(A Study of Relationship of Restaurants with the Perceived Risk and Brand Trust, Brand Value and Word of Mouth: Focused on Popular Chain Restaurant). Culinary Science & Hospitality Research, 25(10), 151-158.

Baek Seo-in (2017). 세계 주요국의 자율주행차 정책 및 기업전략에 관한 통합적 연구(Integrative research on industrial policy and corporate strategy of autonomous car). 지식경영연구(Research on knowledge management), 18(3), 1-36.

Sung Hyun-ah, (2020). 커피전문점 스마트 오더 서비스의 지속사용의도에 영향을 미치는 요인 : 가치기반 수용모델을 중심으로(A Study of Factors Affecting Intention to Continuous Use on Smart Order Service in Coffee Shop - Focused on

Value-Based Adoption Model). Sejong University Graduate School doctoral thesis.

Son Nan-hee (2007). 상담 수퍼비전에서 초심상담자들의 자기고양적 성향과 위협지각(Beginning counselors self-enhancing bias and perceived threat in counseling supervision). Ewha Womans University Graduate School doctoral thesis.

Song Young-ki (2018). 자율주행과 새로운 모빌리티(MaaS) 서비스 시장 동향(Trends of autonomous-driving and Its Mobility as a Service). 오토저널(Journal of the Korea Society of Automotive Engineers), 40(10), 18-20.

Shim Yoon-jung (2018). 통합기술수용이론을 활용한 핀테크 서비스 수용 의도에 관한 연구(A study on factors affecting to fintech service adoption using the UTAUT model). Konkuk University Graduate School doctoral thesis.

Yang Eun-ji, Kang Su-jin, Kwon So-i, Kim Da-yeon, Kim Ji-won, Lee Yu-jeong, Hwang Hye-jeong, Jang Yeong-hyeon (2017). 자율주행차 현황분석과 한국의 경쟁력 확보 전략(Analysis of autonomous-driving Vehicle and Korea's Competitiveness Strategy). The Journal of the Convergence on Culture Technology, 3(2), 49-54.

Yang Ju-sang (2019). 자율주행자동차의 기술적 특성을 고려한 교통사고 원인 책임귀인 인식에 관한 연구(A Study on the Recognition of Responsibility Attributable to Traffic Accident Caused by Technical Characteristics of autonomous vehicle). Doctoral thesis of Korea National University of Transportation Graduate School of Transportation.

Yang Hee-jin, Choi Seong-cheol, (2011). TBSS 편리성, 통제성, 위험비용의 관계 및 TBSS 품질과 성과에 미치는 영향(The Relationship of TBSS Convenience, Control, Risk cost and Examining the influence on TBSS Quality and Performance). 관광연구(Tourism Research), 26(4), 351-373.

Oh Mi-young, Oh Mi-sook (2013). 관광지 위험지각에 있어서의 낙관적 편견에 대한 탐색적 연구(An Exploratory Study on Optimistic Bias in Risk Perception of Tourist Destination). 관광연구저널(Tourism research journal), 27(4), 101-118.

Oh Young-seung (2019). 4 차산업혁명 핵심기술 관련기업의 연구개발투자 비중이 기업가치에 미치는 영향(The impact of R&D investment on firms value related to core technology of the fourth industrial revolution companies). Doctoral Thesis of Catholic University Graduate School.

Yoo Il, Lee Kyung-keun (2007). 성별에 따른 정보기술수용 영향요인간의 관계-인터넷뱅킹 수용자를 중심으로(Gender Differences in Relationships among Influencing Factors of Information Technology Acceptance). 經營硏究(Journal of New Industry and Business), 22(3), 177-206.

Yoo Jae-hyun, Park Chul (2010). 기술수용모델 연구에 대한 종합적 고찰(A Comprehensive Review of Technology Acceptance Model Researches). Entrue Journal of Information Technology, 9(2), 31-50.

Yoo Hoon (2018). Self-Customization Service 수용에 영향을 미치는 요인에 관한 연구 : 가치기반 수용모델을 중심으로(A Study of Critical Factors Affecting Adoption of Self-Customization Service : Focused on value-based adoption model). Soongsil University Graduate School doctoral thesis.

Yoon Yeo-joon, Shin Dong-cheon (2017). 스마트폰 백신의 가치와 수용 의도에 영향을 미치는 요인에 관한 연구(A Study on Factors Affecting Value and Usage Intention of Vaccine for Smart Phones). 정보기술아키텍처연구(Information Technology Architecture Research), 14(3), 277-287.

Yoon Hyun-jung (2018). 자율주행자동차 표준 기술의 이해(Understanding standard technologies of autonomous vehicles). 정보와 통신 열린강좌(Open lectures on information and communication), 35(1), 14-23.

Lee Ga-hee (2018). 외식 배달앱 서비스 편의성이 지각된 가치와 수용, 혁신저항 및 행동의도에 미치는 영향(The effect of service convenience on perceived value, adoption, innovation resistance and behavior intention in food delivery application). Kyung Hee University Graduate School Doctoral Thesis.

Lee Dong-sook (2003). 개인의 성별, 정보 추구성향 및 불건강 행위 간 관계연구(The Relationships among Gender, Information Seeking Style and High Risk Behavior in Korean Adults), 성인간호학회(The Korean Academic Society of Adult Nursing, 19(2), 217-224.

Lee Sang-woo (2016). 리커트 척도의 변화와 강의평가결과(5-point, 7-point Likert scales and course Evaluation). 商品學硏究(Journal of Product Research), 34(4), 33-40.

Lee Seo-yun, Im Hui-rang, and Kim Hak-sun (2019). 가치기반수용모델을 이용한 멤버십 이용자의 지각된 혜택, 희생, 가치, 지속적 이용의도의 영향관계에 관한 연구 : 20 대 CJ 멤버십 서비스 이용자를 중심으로(A Study on Influence Relation of Membership User's Perceived Benefit, Sacrifice, Value and Continuous Use Intention by Using Theory of Value Based Adoption Model (VAM) : Focused on 20's CJ Membership Service). 한국조리학회지(Culinary science and hospitality research), 25(6), 12-22.

Lee Seol-hee, Ham Eun-mi (2010). 한국에 거주하는 한· 중· 미· 일 성인의 암에 대한 낙관적 편견과 암 예방행위 간의 관계(The Relationship between the Optimistic Bias about Cancer and Cancer Preventive Behavior of the Korean, Chinese, American, and Japanese Adult Residing in Korea). Journal of Korean Academy of Nursing, 40(1), 52-59.

Lee Sung-hee (2020). 자율주행자동차의 운행상 안전성확보를 위한 법적 연구(A Study on the Improvement of the Law for Securing the Operational Safety of autonomous-driving Vehicle). A doctoral thesis at Changwon University.

Lee Se-yoon (2020). 항공사 어플리케이션 지속사용의도에 영향을 미치는 요인에 관한 연구 : 가치수용모델을 중심으로(A study on identifying factors influencing continuance usage intention for mobile applications). Sejong University Graduate School doctoral thesis.

Lee Eun-ji (2019). 디지털 뉴스의 가치가 공유행동에 미치는 영향에 관한 연구 : 가치기반수용모델을 중심으로(A study on the effect of digital news value on shared behavior : focused on value-based adoption model). Chung-Ang University Graduate School doctoral thesis.

Jaegwan Lee (2018). 자율주행차 산업기술 방향과 과제(Direction and task of industrial technology of autonomous vehicles). 정보와 통신(Journal of The Korean Institute of Communication Sciences), 35(5), 13-20.

Lee Joon-young, Lee Kyung-soo (2015). 자율주행 차량 기술 동향 및 방향(Trends and directions of autonomous vehicle technology). 제어로봇시스템학회지(The Journal of Control Robot Systems), 21(1), 20-30.

Jang Han-jin, Noh Ki-young (2020). 미세먼지 공포소구가 예방행동의도에 미치는 영향: 자기효능감, 반응효능감, 지각된 위협의 조절된 매개효과(The Influence of Fear Appeals on Behavioral Intention to Prevent Particulate Matter: The Moderated Mediating Effect of Self-efficacy, Response Efficacy, and Perceived Threat). 사이버커뮤니케이션학회지(Cyber Communication Journal), 37(4), 53-101.

Jeon Hyun-mo, Kim Young-kuk (2018). 호텔 예약앱 서비스 수용의도의 영향요인: 가치기반수용모델 적용(Factors Influencing the Adoption Intention of Hotel

Booking App Service : Using the Model of Value-Based Adoption). 외식경영연구(Study on restaurant management), 21(5), 381-401.

Jung Young-joo, Park Jin-hee (2016). 중년기 성인의 뇌졸중 관련 건강지식, 낙관적 편견이 건강증진 생활양식에 미치는 효과(The Effects of the Stroke on the Health Knowledge, Optimistic Bias and Health-Promoting Lifestyle in Middle-Aged Adults). 한국산학기술학회논문지(Journal of Korea Industry-Academic Technology Association), 17(9), 141-155.

Jung In-gu, Son Jo-gi, and Yoon Sung-joon (2020). 혁신제품 수용의향에 관한 연구 : 통합기술수용이론, 기술준비도와 가치기반수용모델을 중심으로(A Study on the Customer's Intention to Accept the Innovative Products: Focused on Unified Theory of Acceptance and Use of Technology (UTAUT), Technology Readiness Index (TRI) and Value-Based Adoption Model(VAM)). 마케팅관리연구 (Marketing Management Research), 25(4), 89-121.

Cho Ga-ryeong (2020). 가치기반수용모델을 적용한 공유숙박플랫폼의 특성요인과 공동가치창출 및 재이용의도 간 구조관계 연구 : Airbnb 를 중심으로(Study on the structural relationship between characteristic factors of shared accommodation platform and co-creation value and reuse intention by applying Value-based Adoption Model : Focusing on Airbnb). Kyung Hee University Graduate School doctoral thesis.

Cho Seung-ah, Kim Sang-un (2018). 관광지 위험지각에 대한 낙관적 편견이 관광지 전환의도 및 위험 감소 행동에 미치는 영향(The Influence of Optimistic Bias on Risk Perception, Tourist Destination Switching Intention, and Risk Reduction Behavior). 관광학연구(Study of tourism), 42(10), 175-190.

Cho Woo-hyung, Jeon Hyun-mo (2020). 패스트푸드 레스토랑의 기술기반 셀프 서비스(TBSS) 도입에 관한 소비자 수용의도 : 가치기반수용모델을

중심으로(Consumer's adoption intention on Introduction of Technology-Based Self Service (TBSS) of Fast Food Restaurant: Focused on Value-Based Adoption Model). 외식경영연구(Study on restaurant management), 23(6), 105-129.

Joo Ji-hyuk (2017). 미세먼지 관련 건강행동에 대한 구조적 관계의 탐색 : 다차원 건강통제소재, 지각된 취약성과 심각성 및 건강행동의도를 중심으로(Exploration of Structural Relations on Health Behavior Related to Particulate Matter : Focused on Multi-Dimensional Health Locus of Control, Perceived Susceptibility and Severity, and Health Behavioral Intention). 한국융합학회논문지(Journal of the Korea Convergence Society), 8(11), 413-421.

Ji Young-soo, Kang Moon-young, and Choi Jeong-il (2016). 가치기반수용모델에 기반한 O2O 커머스 소비자의 구전의도에 관한 연구 : 한· 중 소비자의 비교를 중심으로(A Study of O2O-Commerce Consumers` Word-of-Mouth Intentions Based on the Value-based Adoption Model: The Comparison of Korean and Chinese Consumers). 정보통신정책연구(Research on Information and Communication Policy), 23(4), 81-116.

Cha Dong-pil (2004). 에이즈 문제에 대한 관여도 차원별 인식의 차이와 낙관적 편견에 관한 연구(Self-Serving Bias for HIV/AIDS Infection Among College Students). 홍보학연구(PR research), 8(1), 137-160.

Chun Myung-hwan, Jeong Chul-ho (2012). SNS 사용자의 지각된 상호작용성 및 위험이 만족과 지속사용의도에 미치는 영향(The Effects of Perceived Interactivity and Risk on the User Satisfaction and Continuance Use Intention in SNS). 지식정보기술논문지(Knowledge information technology paper), 7(6), 9-19.

Choi Kyung-ok and Lee Hyung-ryong (2019). 가치기반수용모델을 이용한 항공권 검색 모바일 앱 사용자의 지각된 혜택, 지각된 희생, 지각된 가치, 지속이용의도의 영향관계에 관한 연구(A Study on Influence Relation of Flight Search Mobile Application Users' Perceived Benefit, Perceived Sacrifice, Perceived Value and Continuous Use Intentions by Using Value-based Adoption Model). 관광학연구(Study of tourism), 43(8), 115-135.

Choi Yoon-hee, Lee Yeon-jung , (2016). 커피전문점의 서비스스케이프가 고객의 지각된 가치와 브랜드 태도에 미치는 영향(A Study on the Influence of Coffee Shop's Service-Scape on the Perceived Values, and Brand Attitude of Customers). Culinary Science & Hospitality Research, 22(7), 203-221.

Choi Jong-keun, Chae Myung-shin (2010). 정보보안담당자들의 보안위험에 대한 낙관적 편견에 대한 실증연구(An empirical study of the optimism bias of information security managers about security risks). 한국경영정보학회 학술대회논문집(Journal of the Korean Business Information Society, Journal of academic conference), 2010(1), 417-422.

Choi Jong-geun, Chae Myung-shin (2016). 정보윤리 활동에서 개인의 낙관적 편견과 정보보안 인식 및 정보보안 행위와의 관련성에 관한 실증 연구(An empirical study on the relationship of personal optimistic bias and information security awareness and behavior in the activity of information ethics). 한국산학기술학회 논문지(Journal of Korea Industry-Academic Technology Association), 17(5), 538-547.

Ha Ji-young, Nguyen, Tan, Mai, Jeong Man-su, Mun Jang-ho (2019). 금연효능감과 프레임이 금연광고 메시지의 설득효과에 미치는 영향 연구 : 흡연기간, 흡연량, 낙관적 편견 등 수용자 특성을 중심으로(Study of the Effects of Anti-smoking Effects and Frames on the Persuasion of Anti-Smoking Advertising

Messages : Based on the characteristics of people who accept, such as smoking period, smoking volume, and optimistic bias). 광고학연구(The Korean Journal of Advertising), 30(2), 49-78.

Ham Sang-yeol (2017). 핀테크 서비스 수용의도에 영향을 미치는 요인에 관한 연구 (A Study on Factors Affecting to the adoption intention of Fintech Service). Soongsil University Graduate School doctoral thesis.

Hyun Hyo-won (2020). 가치기반수용모델을 통한 사물 인터넷(Internet of Things) 제품의 소비자 수용과 지속적 사용에 관한 연구(Value-based consumer adoption model for Internet of Things product). Hanyang University Graduate School doctoral thesis.

Hwang Sung-hoon, Yoo Hee-jung, Kim Hwan (2001). 불안 민감성의 개념과 작용에 대한 개관(An overview of the concept and action of anxiety sensitivity). Korean Journal of Clinical Psychology, 20(1), 195-205.

2. International Papers

Allied Market Research (2018). Autonomous Vehicle Market Size, Share and Analysis. https://www.alliedmarketresearch.com/autonomousvehicle-market

Amir, N., Beard, C. (2004). Inhibitory difficulties and anxiety sensitivity. Cognitive Therapy and Research, 28(3), 283-292.

Arnett, J. (2000). Optimistic bias in adolescent and adults mokers. Addictive Behaviors, 25(4), 625-632.

Baker, F., Dye, J., Denniston, M., Ainsworth, S. (2001). Risk perception and cigar smoking behavior. American Journal of Public Health, 25(2), 106-114.

Becker, M. H., Maiman, L. A. (1980). Strategies for enhancing patient compliance. Journal of Community Health, 6(2), 113-775.

Blocker, C. P. (2011). Modeling customer value perceptions in cross-cultural business markets. Journal of Business Research, 64(5), 533-540.

Borkovec, T. D., Alcaine, O. M., & Behar, E. (2004). Avoidance theory of worry and generalized anxiety disorder. In R. G. Heimberg, C. L.

Turk & D. S. Mennin (Eds.), Generalized anxiety disorder : Advances in research and practice (pp.77-108). New York : Guilford.

Buehler, R. , Griffin, D. andRoss, M. (1994). Exploring the 'Planning Fallacy' : Why People Underestimate Their Task Completion Time. Journal of Personality and Social Psychology, 67, 366-381.

Chapin, J. R. (2000). Optimistic bias regarding campus violence, Current Research in Social Psychology, 6(16), 237-251.

Cooper, A. C., Woo, C. Y., Dunkelberg, W. C. (1988). Entrepreneurs' Perceived Chances for Success. Journal of Business Venturing, 3, 97-108.

Davis, F D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly, 13(3), 319-340.

Davis, F. D., Bagozzi, R. P., Warshaw, P. R. (1989). User acceptance of computer technology : A comparison of two theoretical model. Management Science, 35(8), 982-1003.

Dillard, A., Mccaul, K., Klein, W. (2006). Unrealistic optimism in smokers : Implications for smoking myth endorsement and selfprotective motivation. Journal of Health Communication, 11, 93-112.

Dugas, M. J., Freeston, M. H., Ladouceur, R., Rhéaume, J., Provencher, M., Boisvert, J. M. (1998). Worry themes in primary GAD, secondary GAD, and other anxiety disorders. Journal of Anxiety Disorders, 12(3), 253-261.

Eroglu, S. A., Machleit, K. A., & Davis, L. M. (2003). Empirical testing of a model of online store atmospherics and shopper responses. Psychology & Marketing, 20(2), 139-150.

Foa, E. B., Kozak, M. J. (1986). Emotional Processing of Fear. Exposure to Corrective Information. Psychological Bulletin, 99(1), 20-35.

Gain, Alexandria, Hartley, Nicole, Coote, Leonard (2017). The Effects of Consumers' Perceived Value on Consumer Brand Engagement: Consumers' Perceived Value of Music Artists. AMA educators' proceedings, 2017(28), 1-13.

Gold, R., Aucotte, H. (2003). “I’m less at risk than mostguys”: Gaymen’s unrealistic optimism about becoming infected with HIV. International Journal of STD and AIDS, 14, 18-23.

Han, M. J. (1997). Connecting past relevant behaviors to future health consequences and people's risk judgement. PhD Diss., Cornell Univ.

Han, M. J. (1997). Connecting past relevant behaviors to future health consequences and people's risk judgement. PhD Diss., Cornell Univ.

Harris, M, J. (1997). Sufficient grounds for optimism? There lationship between perceived controll ability and optimistic bias. Journal of Social and Clinical Psychology, 15, 9-52.

Hoorens, V. (1995). Self-Favoring Biases, Self-Presentation, and the Self-Other Asymmetry in Social Comparison. Journal of personality, 63(4), 793-817.

Hoyer, J., Becker, E. S., Roth, W. T. (2001). Characteristics of worry in gad patients, social phobics, and controls. Depression and Anxiety, 13(2), 89-96.

Kerin, R. A., Jain, A., & Howard, D. J. (1992). Store shopping experience and consumer price-quality-value perceptions. Journal of Retailing, 68(4), 376–397.

Kim, H. W., Chan, H. C., Gupta, S. (2007). Value-based adoption of mobile internet : an empirical investigation. Decision Support Systems, 43(1), 111-126.
Kim, H. W., Chan, H. C., Gupta, S. (2007). Value-based adoption of mobile internet : an empirical investigation. Decision Support Systems, 43(1), 111-126.
Kirscht, J. P. (1983). Preventive health behavior : A review of research and issues. Health Psychology, 2(3), 277-301.

Klein, W., Weinstein, N. D. (1995). Resistance of personal risk to dediasing interventions. Health Psychology, 14, 132-140.

Kunda, Z. (1987). Motivated inference : Self-serving generation and evaluation of causal theories. Journal of Personality and Social Psychology, 53, 636-647.

Lee, I., & Lee, K. (2015). The Internet of Things (IoT): Applications, investments, and challenges for enterprises. Business Horizons, 58(4), 431-440.

Lee, M. K., Shi, N., Cheung, C. M., Lim, K. H., & Sia, C. L. (2011). Consumer's decision to shop online: The moderating role of positive informational social influence. Information & management, 48(6), 185-191.

Liang, H., Xue, Y. (2009). Avoidance of information technology threats : a theoretical perspective. MIS Quarterly, 33(1), 71-90.

Lin, T. C., Wu, Sh., Hsu, J. S. C., & Chou, Y. C. (2012). The integration of value-based adoption and expectation-confirmation models : An example of IPTV continuance intention. Decision Support Systems, 54(1), 63-75.

Mathieson, K. (1991). Predicting user intentions : Comparing the technology acceptance model with the theory of planned behavior. Information Systems Research, 2(3), 173-191.

Moore, G. C., Benbasat, I. (1991). Development of an instrument to measure the perceptions of adopting an information technology innovation. Information Systems Research, 2(3), 192-222.

Nemcek, M. A. (1990). Health Beliefs and Preventive Behavior a Review of Research Literature. Aaohn Journal, 38(3), 127-138.

Neupane, Sunita (2019). Self Driving Cars : Formulating the Smart Automobile Exception for Smart Vehicles. Criminal law bulletin, 55(3), 384-414.

Perloff, L. S. (1987). Social comparison and illusion of invulnerability to negative life effects, In C. R. Snyder. and C. Ford. Coping with negative life effects : clinicaland socialpsychological perspectves on negative life event. Plenum Press.

Petrick, J. F. (2002). Development of a multi-dimensional scale for measuring the perceived value of a service. Journal of leisure research, 34(2), 119-134.

Radcliffe, N. M., Klein, W. P. M. (2002). Dispositional, unrealistic, and comparative optimism : Differential relations with the knowledge and processing of risk information beliefs about personal risk. Personality and Social Psycholo by Bulletin, 28(6), 836-846.

Reiss, S., McNally, R. J. (1985). Expectancy model of fear. In S. Reiss, R. R. Bootzin (Eds.), Theoretical Issues in Behavior Therapy (pp.107-121). New York : Academic Press.

Rhee, H. S., Ryu, Y. U., Kim, C. T. (2012). Unrealistic optimism on information security management. Computers & Security, 31(2), 221-232.

Roemer, L., Molina, S., Borkovec, T. D. (1997). An investigation of worry content among generally anxious individuals. Journal of Nervous and Mental Disease, 185(5), 314-319.

Rogers, R. W. (1983). Cognitive and physiological processes in fear-based attitude change : A revised theory of protection motivation.
In J. Cacioppo & R. Petty(eds.), Social Psychophysiology : A sourcebook (pp.153-176). New York : Guilford Press.

Roostika, R. (2012). Mobile internet acceptance among university students : A value-based adoption model. International Journal of Research in Management & Technology, 2(1), 21-28.

Sahinoglu, A., & Ang, G. (2012). Can we assess and monitor privacy and security risk for social networks? Procedia-Social and Behavioral Sciences, 57, 163-169.

Salmon, C. T., Park, H. S., Wrigley, B. (2003). Optimistic bias and perceptions of bioterrorism in Michigan corporate spokespersons. Journal of Health Communication, 8, 130-143.

Schierz, P. G., Schilke, O., & Wirtz, B. W. (2010). Understanding consumer acceptance of mobile payment services : An empirical analysis. Electronic commerce research and applications, 9(3), 209-216.

Sheth, J. N., Newman, B. I., Gross, B. L.(1991). Why we buy what we buy : A theory of consumption values. Journal of Business Research, 22(2), 159-170.

Shin, D. H. (2009). A cross-national study of mobile Internet services : A comparison of US and Korean mobile Internet users. Journal of Global Information Management, 17(4), 29-54.

Sweeney, J. C., & Soutar, G. N. (2001). Consumer perceived value: The development of a multiple item scale. Journal of retailing, 77(2), 203-220.

Szajna, B. (1996). Empirical evaluation of the revised technology acceptance model. Management Science, 42, 85-92.

Tallis, F., Davey, G. C. L., Capuzzo, N. (1994). The phenomenology of non-pathological worry : A preliminary investigation. In G. C. L. Davey & F. Tallis (Eds.), Worrying : Perspectives on theory, assessment and treatment (pp.61-89). New York : Wiley.

Taylor, S. E., Aspinwall, L. G., Schneider, S. G., Rodriguez, R., Herbert, M. (1992). Optimism, coping, psychological distress, andhigh-risk sexual behavior among men at risk for acquired immunod eficiency syndrome(AIDS). Journal of Personality and Social Psychology, 63, 460-473.

Taylor, S., Todd, P. A. (1995). Understanding information technology usage: A test of competing models. Information Systems Research, 6, 144-176.

Ulrich, L. (2019). Top ten tech cars 2019 : Self-driving and electric technologies are infiltrating everyday cars—slowly. IEEE spectrum, 56(04), 32-43.

Venkatesh, V. (1999). Creating favorable user perceptions: Exploring the role of intrinsic motivation. MIS Quarterly, 23(2), 239-260.

Venkatesh, V., Morris, M. G., Davis, G. B., Davis, F. D. (2003). User Acceptance of Information Technology : Toward a Unified View. MIS Quarterly, 27(3), 425-478.

Venkatesh, V., Thong, J. Y. L., Xin, X. (2016). Unified Theory of Acceptance and Use of Technology : A Synthesis and the Road Ahead. Journal of the Association for Information Systems, 17(5), 328-276.

Weinstein, N. D. T. (1980). Unrealistic optimism about future life events. Journal of Personality and Social Psychology, 39(5), 806-820.

Weinstein, N. D. T. (1983). Reducing unrealistic optimism about illness susceptibility, Health Psychology, 2(1), 11-20.

Weinstein, N. D. T. (1984). Why it won't happen to me : perceptions of risk factors and susceptibility. Health Psychology, 3, 431-457.

Weinstein, N. D. T., Klein, D. J. (1994). Effects of mood on high elaboration attitude change : The mediating role of likelihood judgments. European Journal of Social Psychology, 24, 25-43.

Weinstein, N. D. T., Klein, D. J. (1994). Effects of mood on high elaboration attitude change : The mediating role of likelihood judgments. European Journal of Social Psychology, 24, 25-43.

Yang, Z., Peterson, R. T. (2004). Customer Perceived Value, Satisfaction, and Loyalty: The Role of Switching Costs. Psychology & marketing, 21(10), 799-822.

Zeithaml, V. A (1988). Consumer perceptions of price, quality, and value : A means-end model and synthesis of evidence. Journal of Marketing, 52(3), 2-22.

3. Korean Literature

Ko Jong-wook, Ryu Chul (2011). Social Science Statistical Analysis. Seoul: Green.

Kwak Ki-young (2017). Statistical Data Analysis: Utilizing IBM SPSS Statistics. Seoul: Kyungmoon publishers.

Kwon Yong-man, Jang In-hong, and Lee Dong-soo (2017). Understanding statistical analysis: Analysis of actual data using SPSS. Paju: Jayu Academy.

Kim Byeong-wook (2015). Research · Social research sample design and analysis method. Seoul: Kim's Information Strategy Institute.

Kim In-sook, Nam Yu-seon (2016). Fourth Industrial Revolution, New Wave of the Future. Seoul: Heute Books.

Kim Ho-jung, Huh Jeon (2013). SPSS 21.0 Statistical Analysis and Commentary. Seoul: Top Books.

Kim Hee-nyeon (2013). How to write a dissertation in social science. Gimhae: Publishing Department of Inje University.

Noh Hyung-jin, Jung Han-yeol (2010). (by Excel 2007) Business Statistics. Seoul: Hanol Publishing

Mun Su-baek (2017). Understanding and Utilizing Basic Statistics. Seoul: Shinjung Publishing.

Park Kwang-bae (2016). Random analysis and regression analysis (amendment). Seoul: Hakjisa.

Park Joon-sung, So Yong-joon, (2017). Concept and Practice of Statistical Analysis: SPSS 23.0. Seoul: Hakjisa.

Baek Jong-il (2013). Statistical data analysis using SPSS. Seoul: Kyungmoon Publishers.

Seo Eui-hoon (2018). Statistical Analysis: IBM SPSS Statistics. Paju: Jayu Academy.

Song In-sik (2018). Reliability Analysis. Paju: Edam Books.

Song Ji-joon (2015). SPSS/AMOS Statistical Analysis Method for Writing Papers. Seoul: 21st Century Publishers.

Yoo Jin-eun (2015). Quantitative research method and statistical analysis. Seoul: Hakjisa.

Lee Eun-soo, Cho Jae-beom (2016). Social science research methodology. Paju: Jayu Academy.

Lee Hee-yeon, Noh Seung-chul (2013). Advanced statistical analysis: Theory and practice. Seoul: Moonwoosa.

Jang Sung-hwa, Lee Ju-yeon, Lee Hyo-ja, Choi Sung-yeol, Choi Eun-hee, Hwang Yun-mi (2016). SPSS, AMOS Statistical Analysis. Seoul: Dongmoonsa.

Jeong Doo-bae (2012). Social Science Research Methodology: Theory and Practical Application. Chuncheon: Kyungmoon Publishers.

Jung Woo-suk, Son Il-kwon (2010). Scientific research methodology. Seoul: Dooyangsa.

Chae Gu-muk (2014). Social Science Statistical Analysis. Paju: Yangseowon.

Chae Seo-il (2016). Social Science Research Methodology. Seoul: B&M Books 4th Edition.

Chae Seo-il, Kim Joo-young (2017). Social Science Research Methodology. Seoul: B&M Books.

Choi Hyun-chul (2016). Social Science Statistical Analysis: SPSS / PC + Windows 23.0 (Revised Edition). Paju: Nanam.

Huh Myung-hoe (2010). SPSS Survey Method. Seoul: Hannarae Publishing.

4. International Literature

Ajzen, I., Fishbein, M. (1980). Understanding attitudes and predicting social behavior. Englewood Cliffs, NJ : Prentice-Hall.

Compeau, D. R., Higgins, C. A. (1995). Computer Self-Efficacy : Development of a Measure and Initial Test. MIS Quarterly, 19(2), 189-211.

Eliot, L. B. (2018). A.I. innovations and autonomous vehicles : practical advances in artificial intelligence (A.I.) and machine learning. LBE Press Publishing.

Fishbein, M., Ajzen, I. (1975). Belief, attitude, intention and behavior : An introduction to theory and research. MA : Addison-Wesley.

Holbrook, M. B. (1999). Consumer value : A framework for analysis and research. Psychology Press.

IRS Global (2019). Trends in the development and business prospects of Autonomous Things, a strategic technology in the era of the Fourth Industrial Revolution: (autonomous) robots, autonomous vehicles, and drones 中心. Incheon: IRS Global.

IRS Global (2020). Future Mobility Revolution, Development Trends and Commercialization Prospects of Flying Vehicles and Autonomous Vehicles. Incheon: IRS Global.

Peter, J. P., Olsen, J. C. (1987). Consumer Behavior : marketing strategy perspective. Irwin, 1987.

Rogers, E. M. (1995). Diffusion of innovations. New York : The Free Press.

Schulz, Thomas, Lee Duk-im (2016). The Future of Google: The world they dream beyond the digital age. Seoul: Business Books.| What Google Really Wants.