jamk

AI user experience in personal vehicles - experiences, perceptions and ideas

Mehedi Piash
Fasih Tayyab

Bachelor's thesis
February 2025
International Business

jamk | Jyväskylän ammattikorkeakoulu
University of Applied Sciences

jamk

Description

Piash, Mehedi & Tayyab, Fasih

AI user experience in personal vehicles - experiences, perceptions and ideas

Jyväskylä: JAMK University of Applied Sciences, February 2025, 59 pages

Degree Program in International Business. Bachelor's thesis.

Permission for open access publication: Yes

Language of publication: English

Abstract

This study investigates the current application of artificial intelligence (AI) in the automotive industry and how the end-users perceive its influence on their driving experience. The use of AI in self-driving cars, adaptive cruise control, smart voice assistants, and predictive maintenance has become a rapidly advancing AI technology alongside the metamorphosis of mobility. The purpose of this research was to capture the current implementations and future expectations along with user concerns regarding AI in personal vehicles.

A total of 142 active car users participated in the quantitative survey to answer structured questions designed to reflect their experiences and perceptions to a broader level. The study was conducted across Finland and other parts of Europe in early 2025 when the region was at the forefront of adoption of automotive technologies. Descriptive statistical methods were employed to analyze the data to uncover emerging trends in the use, satisfaction, trust, and satisfaction regarding AI features of the vehicles.

The findings reveal that the reliance of respondents AI-powered systems that increase convenience, safety, and personalized services slated a burden of suspicions regarding warranty, data security, and full automation preparedness of the systems remained. The research also demonstrates the noticeable gap between advancements in technology and trust from users, exacerbated by the rapid pace of innovation and limited access to tangible experiences driving autonomous systems.

The research results enhance current academic knowledge base through European user-centered analysis which supplements research focused on technologies and industries. The study provides manufacturers of vehicles with practical guidelines that focus on integrating ethical AI properly and teaching users effectively and designing inclusively together with maintaining clear data disclosure standards. The research generates significant knowledge, but its results become less relevant because they appear in a specific time period and geographic area and amid continuous developments in AI technology. Future research needs extensive longitudinal investigations along with cross-cultural assessments in order to improve understanding about AI effects on automotive interactions.

Keywords/tags (subjects)

Artificial Intelligence (AI), Automotive Industry, User Experience (UX), Human–Machine Interaction, Smart Vehicles, Autonomous Driving, Data Privacy, Quantitative Survey, Descriptive Statistics

Miscellaneous (Confidential information)

N/A

Contents

Figures

1 Introduction

1.1 Overview

The integration of Artificial Intelligence (AI) into the automotive industry creates significant changes throughout all its vital components beginning with manufacturing and moving toward user experience. Artificial Intelligence advances drive a revolution which utilizes enhanced operational efficiencies to enable new safety and personalization opportunities within automotive technologies. Smart materials integrated with IoT devices accelerate this evolutionary change by enabling live data acquisition and improved vehicle management systems which transform vehicle assessment procedures and maintenance approaches and human interactions with them (Ammar et al., 2022).

AI technology provides complete spectrum influence through manipulation of production processes in addition to transforming end-user interactions. AI-driven predictive maintenance systems use real-time data to forecast equipment failures before they happen then provide recommended proactive solutions that reduce both maintenance expenses and equipment downtime (Arena et al., 2021). AI-powered industrial robots used in auto component manufacturing have transformed production lines into optimized systems which yield higher productivity together with decreased human mistakes (Pillaia & Sivathanu, 2022).

The automotive industry implements artificial intelligence to set new directions in sustainable practices that match global environmental targets. The optimization power of AI and IoT enhances sustainable resource use and enhances energy efficiency thus delivering long-term sustainability for the industry (Judijanto & Vandika, 2024).

The growing use of AI in automotive manufacturing and maintenance has changed employment patterns by requiring workers to learn new abilities thus transforming labor relationships and productivity throughout this sector (Moniz et al., 2022). Continuous advancements in AI technology reveal the extensive and diverse influence of artificial intelligence on the automotive industry while reshaping industrial patterns toward digital smart manufacturing and the transformation of traditional automobile approaches.

1.2 Research motivation

This research was motivated by widespread views that few technical advances will be more transformational than artificial intelligence (AI), coupled with one of the most innovative industries of the 21st century, the automotive industry. With the benefits AI has on manufacturing processes, vehicle performance, and user experience, understanding its wide-ranging effects has never been more important. For the automotive industry, it is not only about operational efficiency or enhancing customer experience by harnessing AI but also leveraging the potential of AI to bring in some sustainability in the industry and help address global environmental challenges.

Moreover, the emergence of AI-based cars is also causing some rumbles given its high-impact potential associated with fields such as predictive maintenance, safety systems, and autonomous driving among others. While these innovations are putting a lot of pep in the step of the average citizen, there are some ethical, regulatory, and cyber-security twisters aplenty around these advances.

At a personal level, this research is driven by the question of how AI technology can also redefine the future of mobility and human-vehicle interaction beyond efficiency to one that is seamless, natural and intuitive. This paper seeks to provide timely insight on both the opportunity space and potential risks of AI and guide automakers as they plot their way toward a smarter, safer, and sustainable automotive industry between the near and far future.

1.3 Research Objectives and Questions

This research dives into the varying role of AI technology as it influences both automotive user experiences and commercial practices. The research centers around three core questions:

1.3.1 How is AI used currently in automotive industry and what is the impact of AI on the end-user level?

This research will investigate existing AI utilization in the automotive sector while analyzing the ways technology boosts vehicle performance and provides improved safety measures and redesigns user system interactions.

1.3.2 What could be possible in the future?

Through exploratory research this study projects forthcoming AI technologies which will influence automotive manufacturing and user experience as well as industry standards.

1.3.3 What should car makers do to take advantage of the future opportunities and mitigate the risk?

To effectively and responsibly implement AI capabilities automakers must take strategic measures that should address evolving regulatory factors and the cybersecurity realm and automated product ethics.

1.4 Thesis Structure

1.4.1 CHAPTER 1 – Introduction

In this chapter, artificial intelligence (AI) is introduced as part of the automotive industry, focusing on the digitalization and automation process. This chapter describes the introduction for in-car AI assistants and then explains the research aims and questions followed by the rationale of the research.

1.4.2 Chapter 2 - Literature Review

This chapter explores previous researches on adoption and effect of AI on Automotive Industry. It explores how AI is improving manufacturing capabilities, increasing vehicle capabilities, and even having a predict impact on the industry in the near future.

1.4.3 Chapter 3 - Research Methodology

This chapter discusses the qualitative research techniques that will be employed to analyze the impact that AI has had on the automotive industry. It details the data collection strategy and analytical methods used in conducting two focus group interviews with current car users.

1.4.4 Chapter 4 – Results

This chapter will illustrate the findings obtained from the focus group interviews, and how users perceive and use AI technologies in their vehicles. The document outlines the important focus areas including user experience, and how AI is or will affect driving experience in general.

1.4.5 Chapter 5 - Conclusion and Implications

The last chapter combines the literature review and empirical outcomes to answer the research questions. It also talks about impact on automakers and what they should do to capitalize on AI. It also discusses the limitations and future research directions are outlined.

This structured approach provides a logical sequence that flows from an introduction to an overview of research results and strategic recommendations, resulting in a comprehensive and cohesive report.

2 Literature Review

The rapid spread of artificial intelligence (AI) is truly changing the way the automotive industry works; from the manufacturing process to how a user experiences a vehicle. Through the spectrum of AI integration levels, this literature review discusses the role played by AI in the automotive sector, its already observable short-term consequences, long-term perspectives of development as well as possible approaches that should be taken by automotive manufacturers to gain the maximum benefits and minimize the potential risks from the accelerated development of AI.

2.1 Current Use and Impact of AI in the Automotive Industry

Artificial Intelligence (AI) has now penetrated the entire automotive sector, transforming everything from how vehicles are manufactured to how consumers experience driving. AI is playing a role in a number of areas and is doing a great job in increasing efficiency, safety and more.

2.1.1 Impact on Manufacturing

AI's impact on automotive manufacturing is broad and revolutionary across the entirety of the production system. The integration of AI systems doesn't just automate production lines; it also improves the accuracy and quality of manufacturing processes.

- **Smart factory:** AI systems are integrated into manufacturing operations creating the 'smart factory, where machinery and equipment are interconnected and communication with or among them happens seamlessly to optimize production workflows. AI-driven systems can forecast equipment failures, plan maintenance activities ahead of any such occurrences, and change processes in real-time, resulting in better quality products and less waste (Müller, 2022).

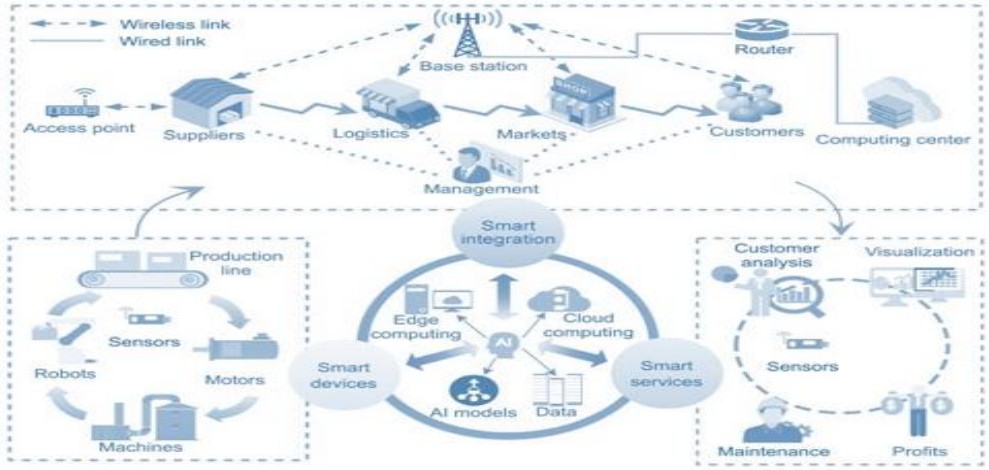

Figure 1: AI-enabled smart factory architecture (Wan et al., 2021)

- **Quality Control:** AI technologies have become essential for improving quality control processes in automotive manufacturing. Using machine vision and automated sensors, AI systems can identify defects in parts and assemblies at the micro-level that human inspectors simply cannot perceive. This ability guarantees that each vehicle upholds strict quality requirements which is extremely important in terms of customer security and corporate persona (Mandala, 2022).
- **Supply Chain Optimization:** AI algorithms improve the efficiency of supply chain logistics by anticipating changes in demand and making changes in raw material demands and production schedules. Such a model can decrease inventory expenditures, increase efficiency if there are any interruptions in the production line and minimize all waste (Mandala, 2022).

2.1.2 End-User Impact

AI is not only affecting manufacturing but also the way a driver experiences a vehicle. AI significantly improves the functional capabilities of the vehicle, driving experience and safety, which is a disruptive moment in the manner consumers engage with their vehicle.

- **Improved Navigation and Connectivity:** AI systems enable advanced navigation solutions that provide real-time traffic information, optimal routing, and predictive route recommendations based on historical analytics. They are embedded into the vehicle's infotainment systems, allowing drivers to use a seamless and intuitive user interface (Madapusi Sundar, 2021).

- **Predictive Maintenance:** AI automotive diagnostic tools can anticipate the maintenance needs of a vehicle before they escalate into major problems. Utilizing data collected from the vehicle's functionality, AI can notify the drivers of issues, book service appointments and order parts if necessary (Madapusi Sundar, 2021).
- **Personalization:** AI allows for highly personalized experiences in vehicles. From automatic seat adjustments and climate control, to adapting to the driver's multimedia and driving styles, AI makes cars more user-friendly and personalized. These features not only elevate driving experience, but also increase driver satisfaction and loyalty.
- **Safety features:** The most significant influence AI can have on end-users is probably in the improvement of safety features. Advanced driver-assistance systems (ADAS), features like adaptive cruise control, lane keeping assist, and autonomous emergency braking, are all supported by AI. These systems use artificial intelligence to make quick decisions that have the potential to avoid accidents and save lives (Madapusi Sundar, 2021).

The current use of AI in the automotive industry highlights how it has the potential to transform traditional practices. AI will set new standards everywhere, be it smart automation to optimize manufacturing processes, or advanced safety and personalization to enhance end-user experience. Such applications will only improve as technologies continue to evolve, and consequently, AI will become more deeply woven into the fabric of automotive industry processes and consumer expectations. The constant streams of innovation pushing the envelope also lays the groundwork for coming advancements that will change everything from mobility to automotive function.

2.2 Future Possibilities of AI in the Automotive Industry

AI integration in the automotive industry will create a future where automotive and technology sectors will merge progressively. AI development speed creates new opportunities in car manufacturing which leads to altering both vehicle operations and the system integration of automotive components within social networks and technological structures.

2.1.3 Fully Autonomous Driving (FSD)

This is one of the most anticipated entries in the development of automotive technology. These are vehicles that drive themselves, an advanced form of autonomous technology that is capable of interpreting the world around it through an integrated set of sensors, cameras, and radars to get from point A to point B safely and efficiently.

- **Urban Mobility:** The use of fully autonomous vehicles in urban environments could bring transformation to public transportation by diminishing individual car ownership which would result in decreased traffic issues and air pollution amounts. Autonomous vehicles through their advanced technology would ensure secure and dependable transportation services when public transportation services decrease their frequency (Volkswagen AG & Leiden University, 1 C.E.).
- **Commercial and Freight Transport:** AI technology enables commercial and freight transport through continuous autonomous truck operations with lower delivery costs and periods that result from replacing human operators. Supply chain efficiency and responsiveness increase as a result of this technology improvement (Volkswagen AG & Leiden University, 1 C.E.).

2.1.4 Smart Infrastructure Integration

Smart infrastructure integration will take place as cities become smart cities because vehicles will interact with urban elements and vehicles and pedestrians for optimized safety and traffic flow.

- **V2X Communication:** AI-based V2X (Vehicle-to-everything) communication provides vehicles with the capability to link with city infrastructure such as traffic lights and road signs to enhance traffic management and decrease congestion. The implementation of smarter routing systems and adaptive traffic patterns responds immediately to current ground conditions (Madapusi Sundar, 2021).

- **Energy Management:** AI conducts essential energy management through optimized EV charging times and locations based on current energy supply and demand patterns. The growing EV adoption requires attention to urban power grids because it increases their demands (Madapusi Sundar, 2021).

2.1.5 Personalization and User Experience

With the increased capabilities of AI rides will also undergo an extreme transformation in the level of personalization, making the interactions of the user with his/her ride more convenient than a sedentary daily experience.

- **Health Monitoring:** AI can be used as a health monitoring system and in future when cars will come as a fully automated vehicles then these systems will be able to accurately monitor the drivers' vital signs, if car notices any signs of fatigue or distress behavior of the driver it can implement its own safety measures or even contact appropriate drill teams if need (Madapusi Sundar, 2021).
- **Personalized In-Car Experience:** AI can make the car a rolling media and commerce center, enabling passengers to view curated content, take part in video conferences, or receive updates and information that are both relevant and timely according to individual preferences (Madapusi Sundar, 2021).

2.1.6 Advanced Manufacturing Techniques

AI will continuously transform automotive manufacturing processes with advanced robotics, 3D printing, and autonomous quality control systems.

- **Adaptable Manufacturing:** Without manual reprogramming, AI systems can make the manufacturing equipment adaptive to changing production requirements or design specifications, greatly reducing and speeding up production downtime and increasing manufacturing flexibility (Müller, 2022).
- **Material Science:** AI-based analysis of new materials can result in the creation of new materials that are lighter, stronger, and more environmentally friendly, which will change vehicle design for better performance and efficiency (Mandela, 2022).

The future outlook for AI in the automotive industry paints a picture in which vehicles are more than just modes of transportation but integrated elements of a larger technological ecosystem. It

will provide advanced urban planning, individual mobility and world logistics, flattening the world into a new era of unparalleled efficiency and connectivity. Sustaining these technologies will pose challenges for automakers and policymakers alike over cybersecurity, data privacy, and ethical considerations, requiring new systems of regulation or other governance mechanisms.

2.2 Strategic Recommendations for Automakers

With AI driving the future of the automobile, automakers now are under the microscope to make the most of these tools while also moving forward within their challenges. Sustainable success will require an integrated approach that includes technology development, ethical considerations, workforce transition, and regulatory compliance.

With AI driving the future of the automobile, automakers now are under the microscope to make the most of these tools while also moving forward within their challenges. Sustainable success will require an integrated approach that includes technology development, ethical considerations, workforce transition, and regulatory compliance.

2.2.1 Increased Investment in Research and Development (R&D)

Automakers need to pump up funding for research into AI. This commitment should not just be directed at strengthening existing AI applications but extending to in-vogue AI technologies with the potential to alter automotive functions of the future. By investing in R&D, automakers will thus be able to identify new uses of AI such as using advancement materials for manufacturing or designs that allow for energy efficiency, which can help in gaining an edge in a competitive market that is rapidly evolving. In addition, partnerships with technology companies, startups, and research institutions can speed up innovation by introducing new ideas and advanced technologies to their R&D processes (Llopis-Albert, Rubio, & Valero, 2021).

2.2.2 Developing a solid AI infrastructure

For automakers, having a robust AI infrastructure is essential. This comprising of the hardware and software frameworks that supports an AI operation including everything from data collection and analysis systems to cloud computing platforms capable of processing in the range of petabytes of information produced by an AI application. As AI systems become more sophisticated and reliant on cloud resources, automakers will also need to ensure that their IT infrastructure is capable of

scaling to meet this demand, with seamless integration and operations spanning different platforms and geographies (Demlehner, 2022).

2.2.3 Data Ethics and Privacy

Automotive strategies for AI need to be centered around ethical issues and data privacy. Automakers must develop clear ethical standards for the use of AI, including overseeing decisions about autonomous vehicle operation, data usage and consumer privacy. By being open about data practices before attacks happen and maintaining strong cybersecurity practices that can help people feel confident enough to get the information they need to be protected against data breaches and more dangerous cybercrimes. These measures include enabling automakers to appoint ethics officers and building ethics boards to oversee AI implementations to ensure compliance not only with legal requirements but also with social expectations (Demlehner, 2022).

2.2.4 Workforce Transformation

AI technology will not only impact the vehicle technology, but also the skill sets for the people developing, manufacturing, and servicing those vehicles. Automotive companies need to prepare themselves for the negative impact of the trends on their workforce and deploy widespread and comprehensive training and education programs. It means re-skilling employees who may be displaced by automation and upskilling others to work effectively with new technologies. Collaborations with universities to create specialized programs in areas like AI and robotics, data analysis, etc., would nurture a talent pool that possesses the right skillsets for the future of automotive manufacturing.

2.2.5 Proactive Regulatory Engagement

Keeping up with the changing regulatory landscape is another key arena for automakers. They must work ahead of being regulated and get involved as a contributor in the development of standards and regulations that will regulate the use of AI technologies within vehicles. Such participation may include contributing to discussions surrounding safe conditions for autonomous vehicles, cybersecurity frameworks for connected vehicles, and ethical frameworks for AI. This enables automakers to help ensure that the regulatory landscape balances the need for innovation with consumer protection and public safety (Salian, 2023).

2.2.6 Sustainability and Corporate Social Responsibility (CSR)

With the focus on environmental issues increasing, automakers will need to embed sustainability into their AI playbooks. For example, leveraging AI for fuel-efficiency, emissions, and manufacturing process improvements to reduce waste. It makes perfect sense for automakers to boost what they are doing as part of their CSR initiatives, which could definitely help them improve their brand and generate more interest with sustainability focused consumers (Madapusi Sundar, 2021).

AI is an incredible opportunity in the automotive space, and the correct application to bring more functionality to vehicles, more efficiency to manufacturing, and better OEM and consumer experiences will be game-changing. But alongside such integration, come big responsibilities. Automakers would need to be careful in multiple fronts like investment in R&D, in ethics, in workforce, and in regulations. Through a comprehensive and long-term strategy, automakers can overcome the challenges offered by AI and harness its full potential to guide the industry into a more innovative and sustainable future.

2.3 Summary of the Knowledge Base

Artificial intelligence is changing the landscape of the automotive industry, revolutionizing manufacturing, as well as user experience. AI brings efficiency in manufacturing through smart factories, predictive maintenance, and supply chain optimization. This is how AI-driven quality control promises higher precision while automation on the shop floor reduces costs and limits waste.

AI enhances navigation, predictive maintenance, and personalization for end-users, resulting in a more seamless and safer driving experience. The plethora of advanced driver-assistance systems (ADAS) effectively improves road safety and makes driving an easier task with the integration of AI-powered safety features to avoid accidents.

In the future, artificial intelligence will power fully autonomous cars changing the way people get around cities and how goods are transported. They will integrate smarter infrastructure by making the V2X communication seamless hence AI optimized energy management will lead to efficiency. The in-car capabilities will also change with AI body sensors, personalized content, and shopping integration.

Automakers should invest more in R&D, build a strong AI infrastructure, handle data in line with ethical considerations, prepare their workforce for the digital age, start engaging with regulators & sustainability. While AI brings incredible opportunities, it needs to be implemented carefully to reap the rewards and minimize risks.

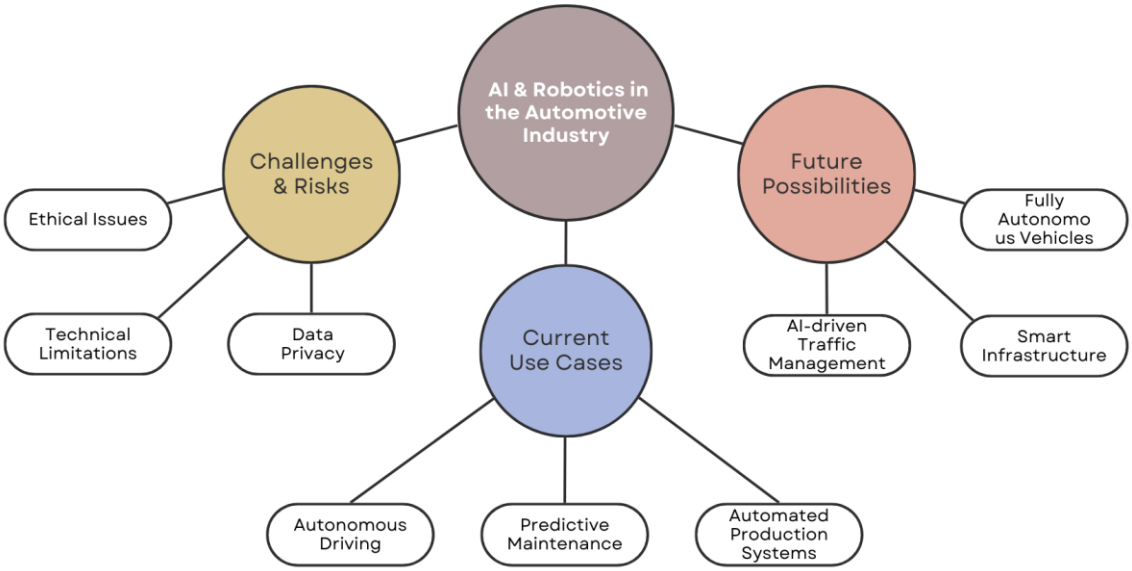

Figure 2: Overview of AI Integration in the Automotive Industry

3 Methodology

This chapter explains the research methods which allowed investigators to study AI user experience within the automotive sector. The research design addresses the philosophical stage and methodological aspects of data collection methods alongside analytical approaches while maintaining standards for ethical compliance throughout the work. The research design components will be explained to demonstrate credibility, reliability, and relevance to the study objectives in this chapter. Every segment deal with a specific element of methodology to establish clarity and enable others to replicate research steps.

3.1 Research Philosophy and Approach

The research adopts a deductive approach under positivism to allow prior studies and industry AI literature to create survey designs and hypotheses. Saunders et al. (2019) explains that researchers should select the deductive approach because it begins with established theoretical frameworks which must be tested against collected empirical data. Creswell (2014) notes that the deductive approach is good when you want to measure and verify existing theories using structured instruments. Many empirical studies employ this methodology for projects that involve systematic variables measurement and analysis.

The study takes a descriptive approach to recognize how users experience AI in personal vehicles right now as well as their beliefs about upcoming advancements in this field. The research instrument contains exploratory elements through unstructured survey questions that obtained user recommendations for manufacturer actions along with anticipated future AI functions in automobiles. Bryman and Bell (2015) state that descriptive studies help researchers understand current phenomena's happenings while exploratory methods enable new findings about user perceptions. Saunders et al. (2019) also say that exploratory designs are useful when the research context is evolving or not yet well understood.

The selected quantitative research method allowed us to obtain standard measurable data through investigation of a wide test group. User trends and group comparison studies require the use of quantitative methods according to Creswell (2014). A quantitative design enables researchers to perform statistical analysis while also supporting the generalization of findings which satisfies the goal of analyzing user trends regarding their satisfaction and familiarity with AI technologies.

Here is a summary of the methodological choices and the academic justification for each, Table 1:

Methodological Element	Chosen Approach	Justification/Source
Research Philosophy	Positivism	Saunders et al. (2019); Creswell (2014)
Research Approach	Deductive	Saunders et al. (2019); Creswell (2014)
Research Strategy	Descriptive (with exploratory elements)	Bryman & Bell (2015); Saunders et al. (2019)
Research Method	Quantitative	Creswell (2014); Fink (2013); Saunders et al. (2019)
Data Collection Tool	Structured online survey	Fink (2013); Saunders et al. (2019)
Data Analysis Technique	Descriptive statistical analysis	Bryman & Bell (2015); Saunders et al. (2019)

Table 1: Summary of Research Design and Supporting Literature

3.2 Data Collection

The research survey collected data through an online format which served to reach diverse active car users. The research method selection relied on surveys because it permitted quantitative collection of data regarding AI user perceptions in vehicles. The survey method provides excellent fit

for descriptive and exploratory research that obtains standard information from substantial participant samples (Fink, 2013; Bryman & Bell, 2015).

The survey strategy delivers effective results to business researchers who want to gather factual and attitudinal data efficiently and cost-effectively as per Saunders et al. (2019). Our online survey approached enabled access to participants who spread across various geographical regions which broadened our reach beyond the barriers of traditional face-to-face or site-based research methods.

Using the well-known Google Forms platform researchers designed the questionnaire to provide both a convenient environment for data collection to the participants. The survey included a mix of:

- **Multiple-choice questions** which gather demographic data and behavioral information such as car usage patterns along with vehicle types.
- **Likert-scale items** for assessing respondent familiarity with AI-based features and their satisfaction and trust levels regarding these features.
- **Open-ended inquiries** which let participants provide their outlooks and make free recommendations and voice their concerns.

Survey construction followed guidelines from Fink (2013) which focus on creating surveys that are neutral with logical organization and high clarity standards. A five-person testing group evaluated the survey through a pilot test process to verify that the research questions were easy to understand while maintaining their direct connection to the study goals. Based on the pilot participants' responses we performed minimal changes to enhance question comprehension and narrative flow.

The research studied car users who either possess AI-based vehicles or drive modern vehicles with advanced driving systems. The study participants needed to demonstrate firsthand knowledge of characteristics such as automated parking along with adaptive cruise control and voice assistant functionality to satisfy the inclusion requirements.

A non-probability sampling strategy was used, specifically convenience sampling, combined with controlled snowballing. The initial respondents were selected based on the inclusion criteria: people who own or regularly use vehicles with AI-driven features such as voice assistants, adaptive cruise control or automated parking. They were asked to share the survey only with others who also met this same criterion, so the target audience remained relevant to the research objectives.

Snowball sampling usually risks a broader distribution, but this controlled version ensured that the study reached a specific and purposeful sample aligned with the research goals. This hybrid approach is valid in exploratory user studies where access to a niche population is needed and full random sampling is not possible (Saunders et al., 2019; Bryman & Bell, 2015).

The online survey collected valid responses from 142 respondents who were part of 180 initially contacted participants, yielding a final response rate of 78.9% throughout three weeks. The high response rate proves that target participants showed strong interest in the study which increases data reliability. The number of gathered responses surpassed the established minimum threshold which researchers advise for undergraduate exploratory quantitative studies. The data collection included multiple user profiles such as car owners alongside frequent non-owner drivers to offer insights regarding AI system usage among various categories of customers.

3.3 Data Analysis

The online survey data underwent quantitative statistical analysis with descriptive methods. The methodology choice was based on the study objective to measure user-related data about AI in automotive which needed precise numerical quantification and comparative capabilities.
Research studies that require the summary of patterns and trends within survey datasets find descriptive statistics as their ideal statistical method (Saunders et al. 2019). The study analyzed participant data through frequency counts and percentage distributions to determine the frequency of observed responses from the total 142 participants.
The following steps composed the data analysis procedure:

- We first exported Google Forms responses to Microsoft Excel for further evaluation.

- A review process was performed to obtain count data for each question based on participant selection.
- The researchers transformed all numerical responses into percentages to generate more efficient comparisons across the various response alternatives.
- Bar charts and pie charts were used to display research findings in order to show how users interacted with AI features while showing satisfaction levels along with trust in AI systems plus their willingness to pay for AI functionality.

The examination method provided an easy-to-understand depiction of essential results which enabled analysts to formulate overall understandings of user perspectives toward automotive AI applications. The study did not include advanced statistical analysis such as correlation and regression since its main focus was exploratory and descriptive instead of predictive or inferential uses.

The research targets were adequately supported through descriptive statistics which delivered essential findings about the following elements:

- The current usage of AI features in vehicles (e.g., voice assistants, adaptive cruise control)
- User satisfaction and trust in these features exists along with.
- Concerns and expectations users have about the future of AI in the automotive industry.

According to Bryman and Bell (2015) descriptive techniques perform successfully in structured survey research for detecting user trends through their quantitative analysis while fitting well into projects with undergraduate capabilities and minimal resources.

3.4 Plan for Research Quality and Ethics

The research procedure required comprehensive steps to maintain credibility along with ethical integrity throughout the research process. This part details the approached that were implemented to maintain research quality by addressing both validity and reliability together with data collection ethics and privacy as well as transparency.

3.4.1 Validity and Reliability

Validity refers to how well a research instrument measures what it's supposed to measure, while reliability is about the consistency and stability of the results when repeated under the same conditions (Saunders et al., 2019; Bryman & Bell, 2015).

To increase content validity, the survey questions were developed based on the literature review and research objectives. The questions were designed to directly address the main themes of the study: users' experiences with AI features in vehicles, trust, satisfaction and future expectations.

Before distribution, the survey was pilot tested with a small group (n=5) who provided feedback on the clarity, wording and structure of the questions. This step helped to eliminate any ambiguity and ensure the questions were clear to the respondents – an important factor in internal validity (Fink, 2013).

For construct validity, the questionnaire used familiar and widely accepted formats such as Likert scales for attitudes (e.g. trust and satisfaction) which are standard tools in social science research for capturing subjective opinions in a structured and quantifiable way (Creswell, 2014).

Reliability was ensured through consistency in the question types and structure across the survey. Similar questions were grouped together logically to avoid respondent confusion and reduce cognitive load. As Bryman and Bell (2015) say, structured surveys with clear instructions and uniform scales help to minimize random errors and increase the likelihood of the same results if the study was repeated under the same conditions.

Although no advanced reliability tests (like Cronbach's Alpha) were done due to the scope and level of the research, the overall process ensured a reasonable level of internal consistency for an undergraduate level quantitative study.

3.4.2 Ethics of the Study

Ethical responsibility is a fundamental part of academic research. This study followed the ethical principles of Bell and Bryman (2007) of voluntary participation, informed consent, anonymity and transparency.

Participants were told at the beginning of the survey:

- What the study was about
- That it was voluntary
- They could skip any question or exit at any time
- Their responses would be anonymous and confidential

No personal identifying information (e.g. names, emails, phone numbers) was collected so all respondents were private and anonymous. Data was collected and stored using Google Forms with access restricted to the research team only. All data was downloaded and stored on a password protected device in line with good data practice (Saunders et al., 2019).

The study was also bias free and had no predetermined outcomes. The researchers were open to all findings including those that may have challenged their assumptions. This is in line with Creswell (2014) who says ethical research should not influence participants and should report all results honestly regardless of the outcome.

No vulnerable groups (e.g. minors or those unable to give informed consent) were targeted in the sampling process. The language of the survey was neutral and non-leading so participants could respond freely and without coercion.

In summary all efforts were made to follow ethical guidelines for business and social research and maintain the integrity and trustworthiness of the process and data.

4 Results

In this chapter, we report on the results of a quantitative survey we conducted with 142 participants to gather data on AI users' experience related to the automotive industry. The survey examined the adoption, perceptions, and expectations of AI technologies across various types of car users: the car owner, frequent users, and occasional users. The information is segmented into four overarching themes: Respondent Profile, Current AI Usage in the Automotive Sector, Future Possibilities of AI, and Suggestions for Car Makers. · Each section gets into details about the workings of the survey answers giving insightful information about perception about the AI and what is expected of the AI in the automotive industry. The findings are presented as-is in this chapter, without interpretation, which occurs in Chapter 5.

4.1 Respondent Profile

This section describes the demographic characteristics of the survey respondents. It describes the patterns of car usage, ownership, and frequency of use, summarizing the different segments within the sample. This data serves to form a baseline for understanding the perception and interactions with AI technologies in cars between different types of car users.

4.1.1 Demographic Distribution

A total of 142 surveys were conducted which show a variety of data reflecting a range of vehicle usage. Demographics of the survey respondents:

- **Yes, I own a car:** 46.5% (66 respondents)
- **Yes, I frequently use a car but do not own one:** 33.1% (47 respondents)

- **No, I rarely use a car:** 20.4% (29 respondents)

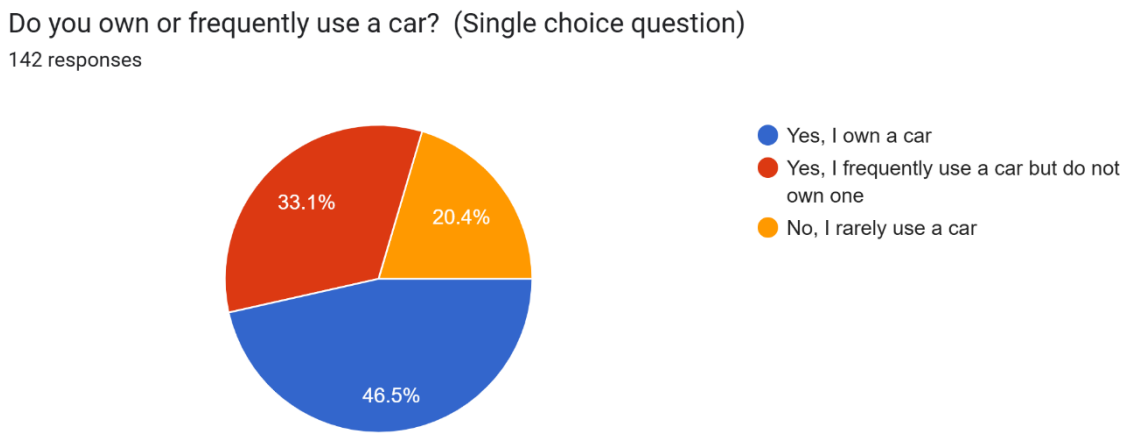

Figure 3: Types of Cars Owners

The demographic spread emphasizes the different frequencies with which automobiles are used, making sure that the survey results cover a broad range of car user experiences and perspectives. Most respondents said they own a car (46.5%), while nearly as many (33.1%) often took a car without owning one. This gives a more balanced perspective on perceptions of AI integration within the automotive space across various functions, with 20.4% of respondents indicating they seldom use a car.

Getting participants who do not own a car but frequently use one is especially important for understanding how the general public would perceive AI-powered car features. It gives some perspective for how non-owners who rely on automobiles perceive the integration of advanced technologies like AI in cars. This will give us a range of car usage, which can help answer such research questions about how AI matters now in user experience.

4.1.2 Vehicle Types

The survey asked participants to specify their main vehicle selection to better understand the extent of their usage with AI technologies in automobiles. The responses were as follows:

- **Traditional (non-AI-assisted) vehicle:** 48.5% (65 respondents)

- **AI-assisted vehicle (e.g., adaptive cruise control, AI-powered infotainment):** 38.1% (51 respondents)
- **Autonomous or semi-autonomous vehicle:** 13.4% (18 respondents)

Traditional vehicles without AI assistance remain the primary choice for most respondents at 48.5% while AI-assisted vehicles are used by 38.1% of the study population. The percentage of vehicle users employing autonomous or semi-autonomous systems stands at 13.4% due to accelerated interest in higher-level AI technologies in automotive industries.

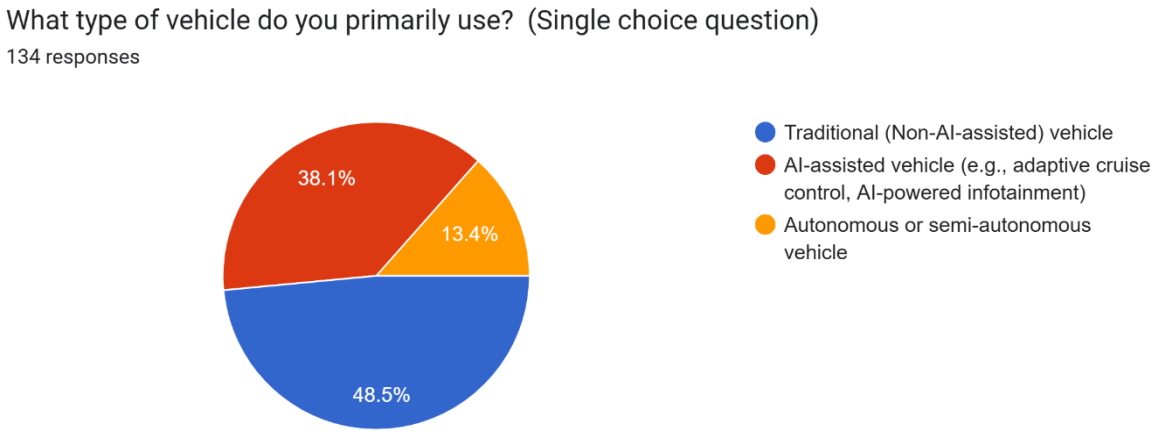

Figure 4: Respondents Vehicle Type

Traditional vehicle use among respondents demonstrates that AI adoption within the automotive industry stands at an initial phase for most consumers. The sizeable user base with AI-assisted vehicles demonstrates the ongoing use of AI technology in automotive industry mainstream products. The proportionally small number of autonomous vehicle owners shows that the automobile industry is in its initial stages of full automation although they reflect projected enthusiasm for autonomous driving technology. The segmentation enables researchers to grasp the level of familiarity AI features have for distinctive user groups which will assist them to analyze feedback about AI usage and expectations within automotive manufacturing.

4.1.3 Familiarity with AI in Cars

The survey required participants to evaluate their understanding of various AI car capabilities with ratings ranging from 1 (Not familiar at all) to 5 (Very familiar). Survey participants distributed their familiarity levels according to the following pattern:

- **1 (Not familiar at all):** 17.6% (25 respondents)
- **2 (Somewhat unfamiliar):** 25.4% (36 respondents)
- **3 (Neutral):** 21.8% (31 respondents)
- **4 (Somewhat familiar):** 25.4% (36 respondents)
- **5 (Very familiar):** 9.9% (14 respondents)

The obtained distribution demonstrates how survey participants exhibited different levels of familiarity regarding AI-based car features.

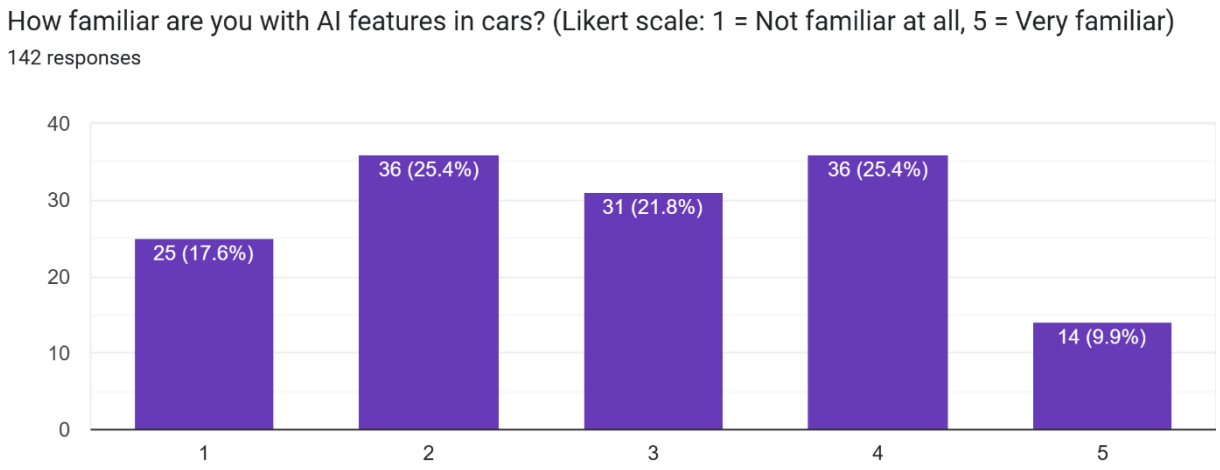

Figure 5: Respondents Familiarity with AI in Cars

4.1.4 Analysis

- **Low Familiarity (1 & 2)**: A substantial portion of 43% of survey participants at levels 1 and 2 reported limited understanding of AI features found in cars thus indicating major segments remain unaware of AI benefits in automobile technology.

- **Neutral (3)**: The level of user familiarity toward AI car features lies at a neutral point according to 21.8% of participants. The respondents show awareness about these technologies though their understanding remains basic since they lack substantial experience with these technologies.

- **High Familiarity (4 & 5)**: Among the respondents examined from levels 4 and 5 the total reached 35.3% and specifically 9.9% identified their knowledge of AI car technologies at "very familiar" (level 5) status. The people in this group have experienced exceptional AI features in their vehicles or actively use autonomous driving or AI-based infotainment and smart safety solutions.

The breakdown of familiarity levels allows researchers to understand people's current awareness and engagement with AI systems in cars among survey participants since different levels of knowledge yield distinct expectations about AI-powered automotive features.

4.2 Current Use of AI in the Automotive Industry

The section in here discusses what components use AI in the vehicles in the present time – i.e. voice assistant, adaptive cruise control, and AI navigation. In this section, we delve into present AI integration in automotive sector by exploring which features are most commonly used and whether or not users are satisfied with these systems.

4.2.1 AI-Powered Car Features Used

Questions were asked to the respondents about which AI-powered car features they have used or experienced:

- **Voice assistants (e.g., Alexa, Siri, Google Assistant in cars):** 45.1% (64 respondents)
- **Adaptive cruise control:** 33.8% (48 respondents)
- **Automated parking assist:** 28.2% (40 respondents)
- **AI-powered navigation and route optimization:** 38% (54 respondents)

- **Predictive maintenance alerts:** 16.9% (24 respondents)
- **None of the above:** 18.3% (26 respondents)

This breakdown provides a view of the most commonly adopted AI features in cars and the perspectives of users about using AI in their cars.

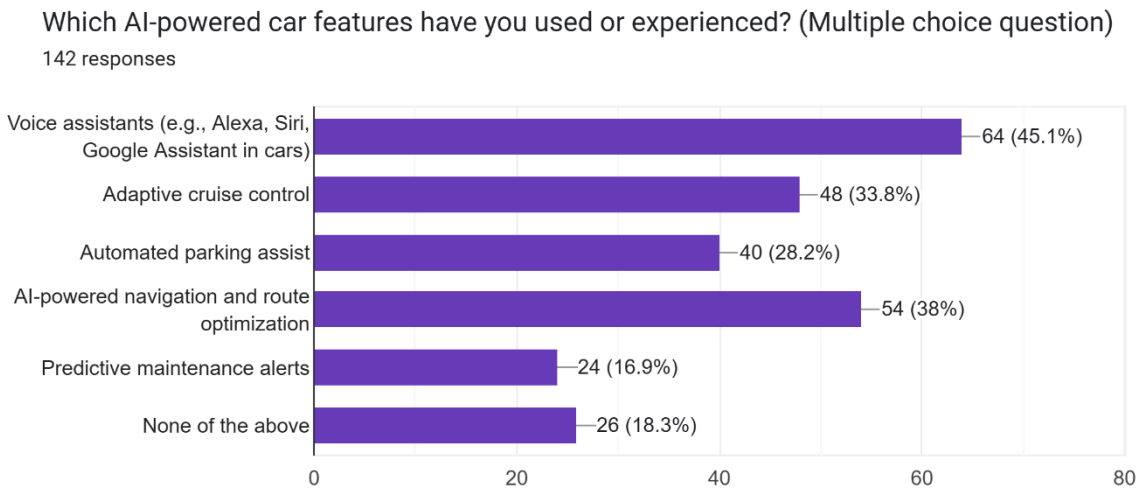

Figure 6: AI Feature Used in a Car by Respondents

4.2.2 Analysis

- **Voice Assistants (45.1%):** The popular AI-based voice assistants like Alexa, Siri, and Google Assistant have been used by 45.1% of the subjects. This indicates the increasing role of voice-enabled AI systems into cars to allow hands-free control and communication.
- **AI-Powered Navigation (38%):** AI-powered navigation and route optimization ranked second, with 38% of respondents reporting having used this functionality. It reflects an overall move towards the heavier use of AI for better route planning, real-time traffic updates and optimized driving experiences.
- **Adaptive Cruise Control (33.8%):** Adaptive cruise control, which adjusts a vehicle's speed according to traffic, was used by 33.8% of respondents. Such a feature helps promote a more secure driving experience, and has become quite mainstream with advanced driver assistance systems (ADAS).

- **Automated Parking Assist (28.2%):** Automated parking assist, which controls steering, braking and throttle to help drivers park, was used by 28.2% of survey respondents. It mirrors increasing acceptance of features in cars engineered to make life easier — at least for tasks such as parking.
- **Predictive maintenance alerts (16.9%):** A less frequent use case, with only 16.9% of respondents reporting predictive maintenance alerts — preventing minor issues from becoming major problems by notifying the driver of possible actions. This means that predictive maintenance is an important AI function, but not yet widespread.
- **None of the Above (18.3%):** And finally, 18.3% of respondents said they have never used any of the above AI features, which could imply that AI use in cars is just getting started for some people.

The extensive coverage with such diverse datasets also paints a comprehensive picture of the real-world impact of autonomous systems on the driving experience, among other things, and reveals features that are currently in widespread use versus early-stage adoption. As AI features evolve and get better, consumers are likely to use them more.

4.2.3 Satisfaction with AI Services

Respondents evaluated their satisfaction level with AI-powered car features based on a Likert-style scale ranging from 1 (Not satisfied) to 5 (Very satisfied). Here is how the satisfaction levels broke down:

- **1 (Not satisfied):** 15.7% (21 respondents)
- **2 (Somewhat dissatisfied):** 14.2% (19 respondents)
- **3 (Neutral):** 21.6% (29 respondents)
- **4 (Somewhat satisfied):** 35.1% (47 respondents)
- **5 (Very satisfied):** 13.4% (18 respondents)

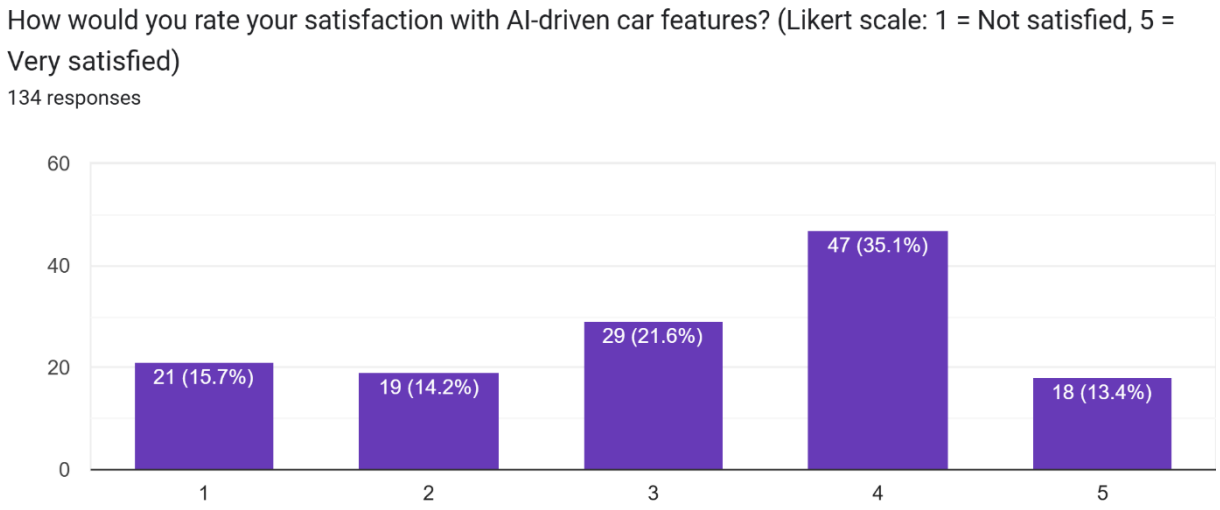

Figure 7: Respondents Satisfaction Level with AI Feature

4.2.4 Analysis

- **Low Satisfaction (Levels 1 and 2):** 29.9% of respondents are in the "Low Satisfaction" category (Levels 1 and 2). That means a sizable number of users displeased or somewhat displeased with AI capabilities in their car, which may suggest problems with things like reliability, complexity, or unmet expectations.
- **Neutral (Level 3):** 21.6% responded in this way, indicating they are neutral and may not feel strongly positive or negative about the AI capabilities available within the vehicles. Because they need help mastering AI technologies and are unsure of how to integrate them into their workflow.
- **High Satisfaction (4 and 5):** 48.5% of the respondents (47+18) said they are somewhat satisfied or highly satisfied with AI features. Another 13.4% said Very satisfied (Level 5). This collective will consist of early adopters or individuals who have had far more positive experiences with AI-driven systems — think voice assistants, adaptive cruise control, and many navigation systems.

The level of satisfaction is evenly distributed, as many users were happy but also leave a lot of respondents neutral or not satisfied. You are scheduled to be recalled on data until October 2023.

4.2.5 Perceived Impact on Safety and Comfort

Survey participants were asked whether they consider AI tools to improve both vehicles driving safety and comfort levels. The statistical data revealed these results from the survey participants:

- **Yes, significantly:** 34.1% (47 respondents)
- **Yes, but only slightly:** 33.3% (46 respondents)
- **No, it makes little difference:** 18.1% (25 respondents)
- **No, it makes driving more complicated:** 14.5% (20 respondents)

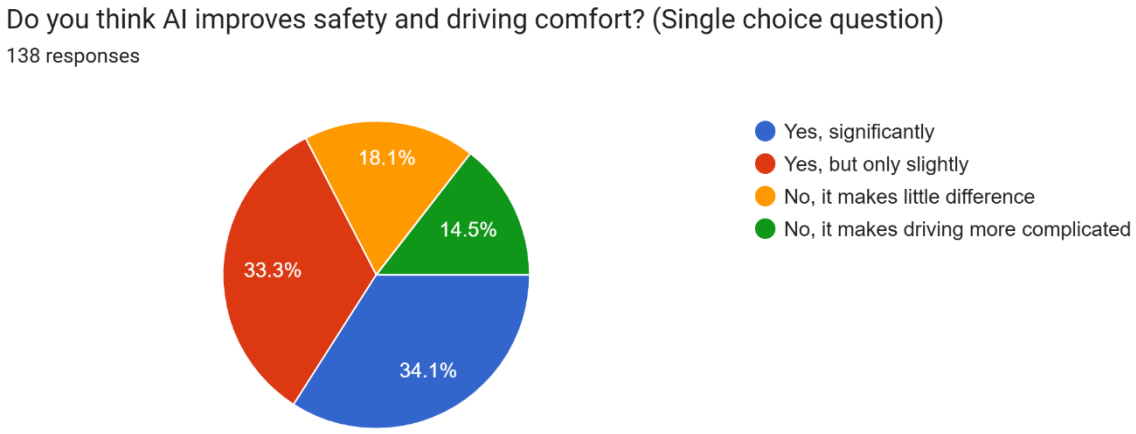

Figure 8: Respondents Perceived Impact

4.2.6 Analysis

- **Positive Impact (Yes, significantly, and yes, but only slightly):** A total of 67.4% of respondents believe that AI for the most part, or to a significant degree, enhances safety and comfort. This portrays confidence in AI technologies, as the respondents seem to appreciate the value that AI features like adaptive cruise control, automated braking, and AI-powered navigational systems offer to their driving experience and overall safety.
- **Neutral or Negative Impact (No, it makes little difference and No, it makes driving more complicated):** On the contrary, 32.6% of respondents showed some form of discontent with the impact of AI. Specifically, 18.1% indicated that AI does not significantly alter their

driving experience whereas 14.5% felt that AI systems, in fact, complicated the driving experience. Such responses indicate some of the concerns or problems that these users try to deal with, probably related to the sophistication of new AI systems or their dependability in real operational conditions.

The above aspects of user's attitudes suggest that despite respondents in general being optimistic about the role of AI in safety and comfort, a considerable proportion of users remain skeptical. This may assist future development steps in AI systems for usability and safety enhancement during design without bringing about additional complications.

4.3 Future Possibilities of AI in the Automotive Industry

This section of the Survey shows responders' views on what AI innovations they expect to see in the auto industry over the course of the next ten years. Highlights of the findings shows a considerable level of interest concerning completely autonomous vehicles, predictive traffic management, and bespoke in-car assistants revealing an evolution in expectations and desire from car users surrounding the potential of AI within automotive technology.

4.3.1 Expected AI Advancements in the Next 10 Years

Participants in the survey were asked to identify the AI-related advancements they believed would materialize in the automotive sector over the next ten years. The answers were as follows:

- **Fully autonomous vehicles:** 44.7% (59 respondents)
- **AI-driven predictive traffic management:** 58.3% (77 respondents)
- **Personalized AI-powered in-car assistants:** 40.2% (53 respondents)
- **AI-powered health and fatigue monitoring:** 34.1% (45 respondents)
- **Smart vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2X) communication:** 30.3% (40 respondents)
- **Other:** 4% (5 respondents) [Some of the suggestions added by the respondents include AI-optimized ride-sharing, AI-controlled public transit, and improved road condition detection.

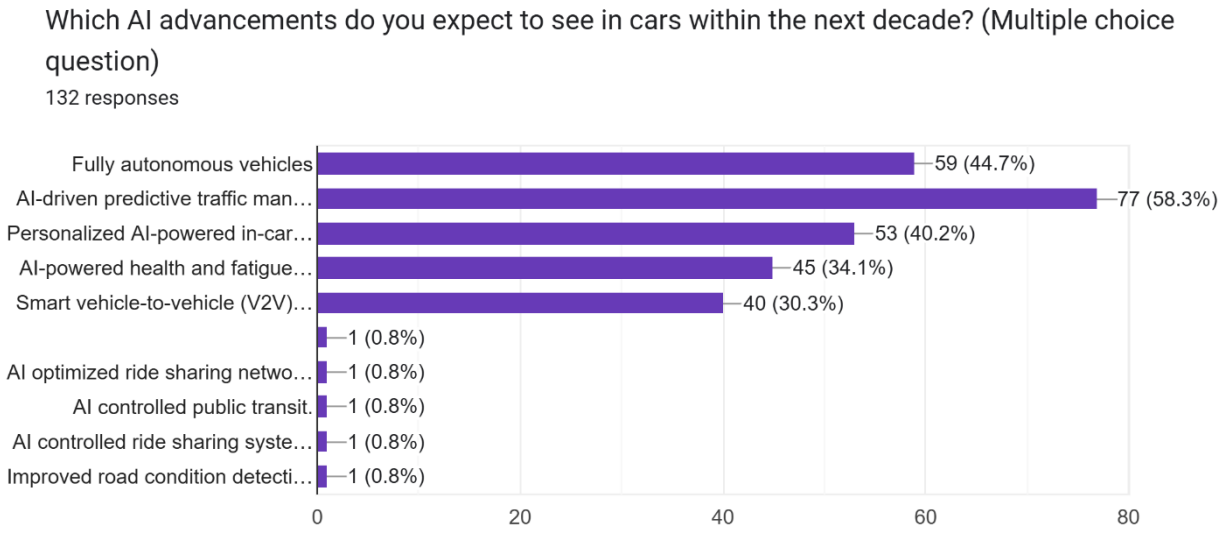

Figure 9: Respondents Expectations with AI in the Next 10 Years

4.3.2 Analysis

- **AI Driven Predictive Traffic Management (58.3%):** Over half of the respondents (58.3%) believe that AI Driven predictive traffic management will be the most anticipated AI advancement. This is a testament to a belief that AI can enhance traffic flow, lessen congestion, and boost overall transportation systems. It demonstrates the need for smarter infrastructure and seamless connectivity between automobiles and urban management systems.

- **Fully Autonomous Vehicles (44.7%):** In second place, 44.7% of respondents believe fully-autonomous vehicles will be a major factor in the coming ten years. This comes amid the continued evolution and trials of self-driving technologies and increasing consumer interest in autonomous vehicles.

- **Personalized AI-powered In-Car Assistants (40.2%):** Another high on the list (40.2% of respondents) was personalized AI-powered in-car assistants, which can learn driver preferences and offer a more seamless driving experience. This implies consumers want more seamless, personalized engagement with their vehicles powered by AI."

- **AI-powered health and fatigue monitoring (34.1%):** 34.1% of respondents awaiting AI on health and fatigue monitoring. It will also help ensure the safety of drivers by detecting

signs of fatigue or health issues and prompting them to take action. The increased focus on driver health and road safety will probably make this tech evolve quickly.

- **Smart V2V and V2X Communication (30.3%):** Roughly 30.3% of people anticipate the establishment of smart communication among vehicles (V2V) and vehicle infrastructure (V2X). Such technologies would include cars that can communicate with each other and traffic infrastructure to provide information to improve safety and efficiency through real-time data sharing and smart routing.
- **Other (4%):** A few other suggestions were submitted alongside the others, which included everything from AI-optimized ridesharing to AI-controlled public transit and even better road condition detection. Pioneers of this vision see a world in which AI transforms transportation as a service, not based on personal possession of a car.

The section presents different expectations for AI technology in automobiles which focus primarily on safety features and traffic system optimization and customized user interface needs. The realized knowledge helps automakers understand market requirements along with upcoming trends for AI equipment in automotive applications.

4.3.2 Likelihood of Fully Autonomous Cars

Participants were asked about the likelihood that fully autonomous vehicles will rule the roads within 20 years. Responses were distributed as follows:

- **1 (Strongly Disagree):** 14.8% (21 respondents)
- **2 (Disagree):** 21.8% (31 respondents)
- **3 (Neutral):** 23.2% (33 respondents)
- **4 (Agree):** 24.6% (35 respondents)
- **5 (Strongly Agree):** 15.5% (22 respondents)

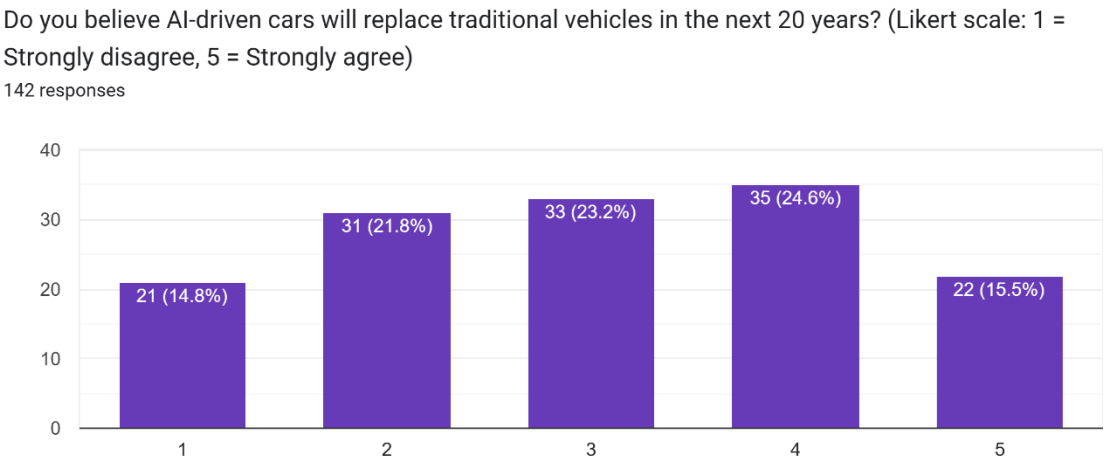

Figure 10: Respondents Regarding Fully Autonomous Vehicle

4.3.3 Analysis

- **Low Likelihood (Levels 1 and 2):** 36.6% of respondents strongly disagree/disagree that fully autonomous cars will be the dominant transport mode in twenty years. This implies that a sizable number of respondents are still doubtful or unconvinced about the mass adoption of self-driving cars (AVs) any time soon. Lack of trust in this regard is likely due to a variety of factors from safety and legal frameworks to technological readiness.

- **Neutral (Level 3):** 23.2% of respondents expressed a neutral view towards the likelihood of fully autonomous vehicles, indicating that they are uncertain or ambivalent about the takeover of the market by driverless cars. This group is likely to need more information or understanding about the development and regulatory context around autonomous driving.

- **High Likelihood (Levels 4 and 5):** A total of 40.1% of respondents believe or strongly believe that fully autonomous cars will be on the top of the cars on the road within the next 20 years. Though big, the number shows cautious optimism, with stakeholders acknowledging that autonomous cars are likely the future but not absolutely confident that they will immediately dominate the roadways.

This reflects a split feeling about the future of self-driving cars. Though a majority of respondents express either optimism or neutrality, a substantial number retain concerns or skepticism regarding the impending era of widespread autonomous driving technology. These findings give clarity on consumer confidence in self-driving cars, and what factors might impact their acceptance going forward.

4.3.3 Comfort Level with Fully Autonomous Vehicles

Responders were asked them whether they would feel comfortable driving a fully autonomous vehicle. The responses were distributed as follows:

- **Yes, completely:** 21.1% (30 respondents)
- **Yes, but with some reservations:** 35.2% (50 respondents)
- **No, I prefer human control:** 35.9% (51 respondents)
- **Not sure:** 7.7% (11 respondents)

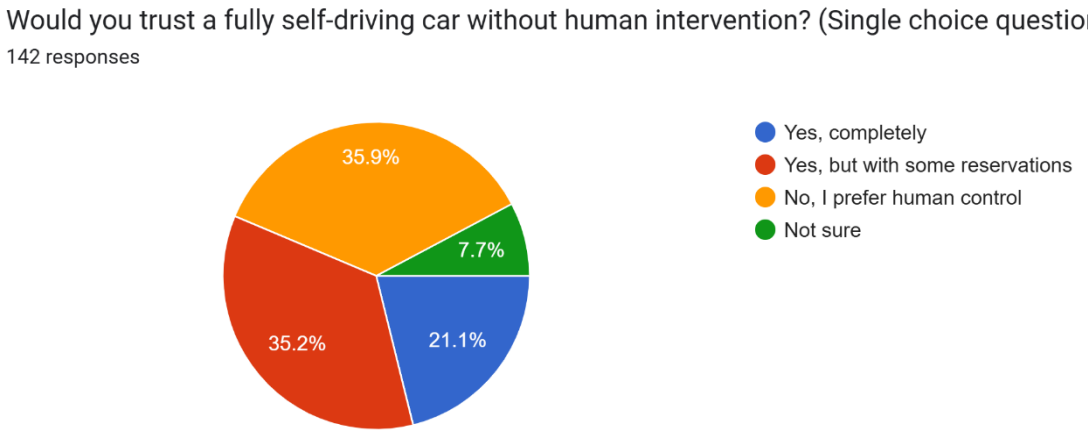

Figure 11: Respondents Comfort Level with Fully Autonomous Vehicle

4.3.4 Analysis

- **Comfortable (Yes, completely and yes, but with some reservations):** A total of 56.3% of respondents are somewhat comfortable with an autonomous vehicle. A total of 30 respondents (21.1 %) indicated they would be completely comfortable, suggesting many are open to autonomy, but there are still some doubts about an autonomous car having full

control. The 35.2% comfortable with “some reservations” is likely to have concerns around the reliability of the technology, safety, or whether the technology is ready for real-world conditions.

- **Prefer Human Control (No, I prefer human control):** Human control remains the preferred method according to 51 respondents who total 35.9% of the participants. Many participants demonstrated their preference for human-operated vehicles since they value being in control when driving along with making decisions and taking responsibility for themselves on the road.
- **Uncertainty (Not sure):** The survey indicates that 7.7% or 11 respondents displayed uncertainty regarding their comfort with self-driving vehicles because they lacked adequate knowledge or faced doubt about these vehicles.

The data shows consumers possess conflicting opinions towards autonomous vehicles. A substantial part of the population embraces the concept of autonomous driving yet many others hold doubts or firmly choose human-operated vehicles because society needs better trust development combined with improved safety mechanisms along with increased public knowledge of self-driving technology systems.

4.4 Recommendations for Car Makers

The section relies on respondent feedback to understand proper ways car manufacturers should implement AI technology in their vehicles. It encompasses crucial themes starting from safety to cybersecurity along with ethical aspects coupled with system reliability. The recommendations serve as a source of direction for manufacturers who want to develop better AI technologies which fulfill customer expectations and resolve user doubts.

4.4.1 Would You Pay Extra for a Car with Advanced AI Features?

Respondents were asked whether they would be willing to pay extra for a car with advanced AI features. The survey participants responded as follows:

- **Yes, AI features are worth the investment:** 33.3% (47 respondents)
- **Maybe, depending on the features:** 42.6% (60 respondents)
- **No, AI features should be standard in all cars:** 24.1% (34 respondents)

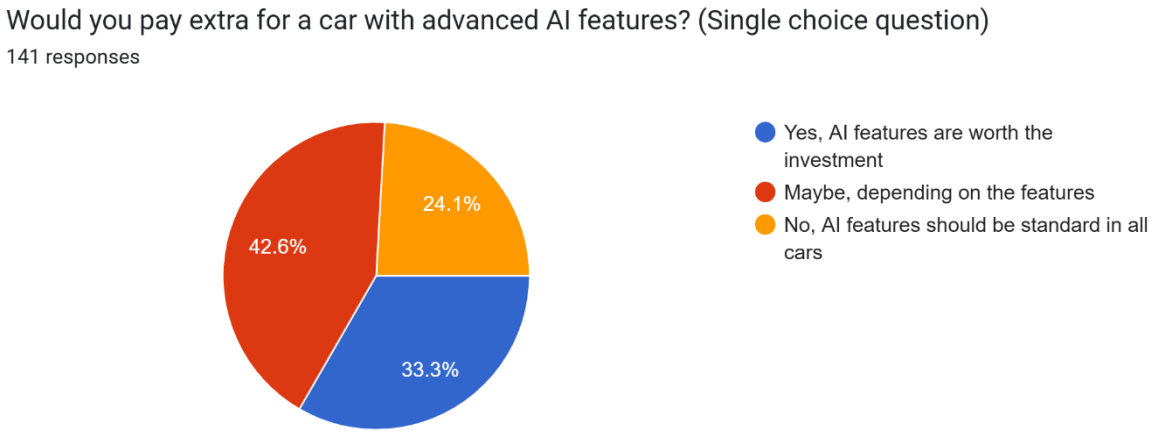

Figure 12: Response on Paying Extra for Fully Autonomous Vehicle

4.4.2 Analysis

- **Yes, AI features are worth the investment (33.3%)**: A significant segment of 33.3% of respondents stated that paying additional expenses for cars benefits from advanced AI features because these features offer worthwhile value. It demonstrates that plenty of consumers are ready to purchase premium AI-based components which enhance both their safety and convenience while improving their driving experience.

- **Maybe, depending on the features (42.6%)**: A major portion of participants (42.6%) expressed willingness to pay additional costs based on the exact AI attributes included in their purchase. Advanced AI features find acceptance with consumers, yet consumers require detailed information about capabilities and dependable performance along with measurement of specific benefits to finalize purchases.

- **No, AI features should be standard in all cars (24.1%)**: A substantial quarter of respondents (24.1%) argued that AI features must become standard equipment in all new vehicles since modern vehicles should include them as basic features. The consumer segment demands AI technologies to become standard features in cars without the need of extra fees.

This data distribution indicates consumers want both premium prices for advanced AI functionalities and complete standardization of AI features across all vehicles because AI holds key importance for automotive manufacturing.

4.4.3 Concerns About AI Integration

Participants shared their concerns regarding the integration of AI into vehicles. Their responses are as follows:

- **AI malfunction or system errors:** 58.5% (83 respondents)
- **Privacy concerns regarding data collection:** 59.9% (85 respondents)
- **Potential job losses in the automotive industry:** 42.3% (60 respondents)
- **Over-reliance on technology, reducing human driving skills:** 36.6% (52 respondents)

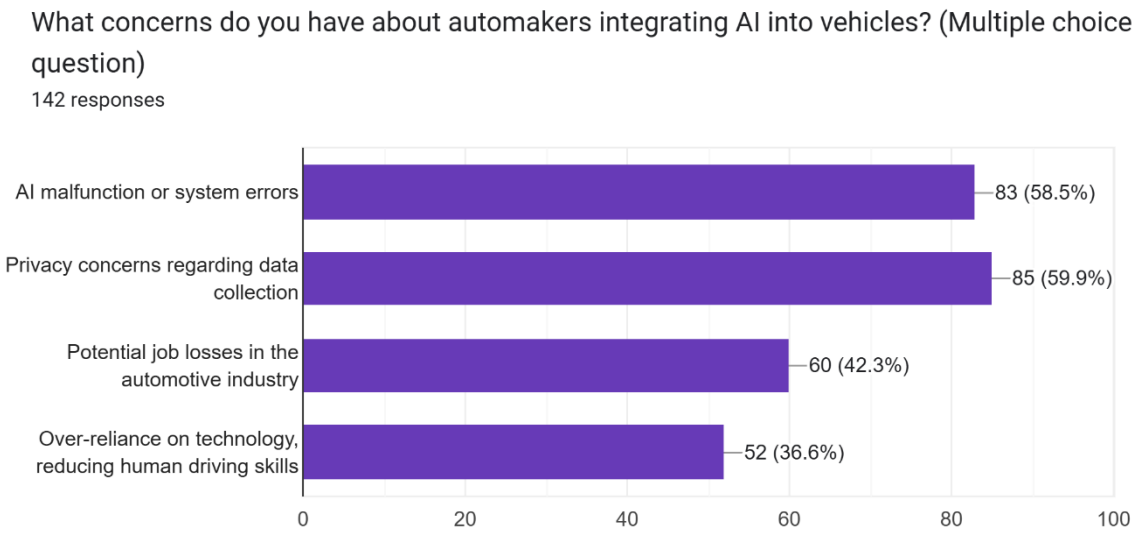

Figure 13: Respondents Concerns Regarding AI Integration

4.4.4 Analysis

- **Privacy on Data Collection (59.9%):** The highest concern among of all respondents (59.9%) was related to privacy and data collection. Users have concerns about how their personal data will be collected by the AI from their cars, including their location and driving habits.

This highlights the necessity for automotive manufacturers to adopt clear data-sharing practices, straightforward consent procedures, and strong data security measures.

- **AI Malfunction or System Errors (58.5%):** Following closely, 58.5% of respondents are worried about AI malfunctions or system errors. These concerns highlight the fear that AI-based systems may fail or malfunction in critical circumstances, such as emergency braking or navigation decision-making. This concern can be alleviated by offering reliability, extensive testing, and manual override.
- **Potential Job Loss. Automotive Industry (42.3%):** 42.3% of the surveyed displayed concern towards potential job loss to the automotive industry due to AI integration. This illustrates a larger social concern over automated labor replacing work, especially in manufacturing, assembly line jobs and driving jobs. Such issues will not be lost on car manufacturers, and they should also work with industry to implement retraining programs for displaced employees as a result of the redistribution within the job market.
- **Over-reliance on Technology, Reducing Human Driving Skills (36.6%):** 36.6% of respondents said they are worried that over-reliance on AI technology will reduce human driving skills. This group has concerns that as drivers increasingly rely on autonomous features, their ability to manage critical driving situations may decline. Automakers need to balance high tech with keeping drivers alert and competent behind the wheel.

This section highlights some of the fundamental issues that automakers need to be working on now if they wish to incorporate AI into cars. Major areas where consumers feel they need more transparency and reassurance are privacy, reliability, the impact on jobs and the potential for diminished human driving skills. Therefore, through addressing these fears, automotive manufacturers can play their part in developing trust and acceptance of AI based technologies in the automobile sector.

4.4.5 Steps Car Makers Should Take to Ensure Responsible AI Adoption

Auto producers need to follow various measures for implementing AI in vehicles responsibly according to survey participants. The participants categorized their recommendations into distinct categories that demonstrated unique matters and needs. Customers who participated in the study identified eight main areas of emphasis: Safety, Reliability & Rigorous Testing, Cybersecurity & Data

Privacy, Accessibility & Inclusiveness, Human Control & Oversight, Ethical AI & Transparency, Training & Education, Regulation & Legal Frameworks, Sustainability & Environmental Focus, Affordability & Availability of Simple Vehicles, and System Integration & Innovation.

➢ **Safety, Reliability & Rigorous Testing**

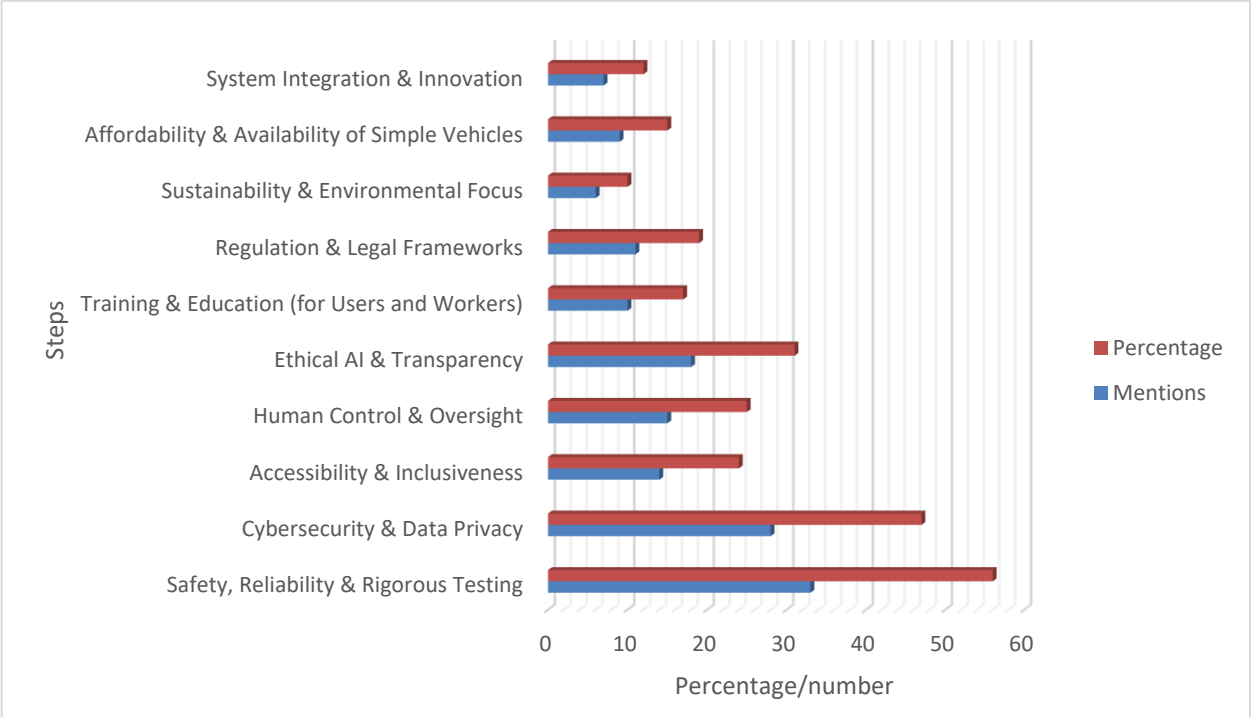

Figure 14: Respondents Suggestions for Automakers

- **Mentions**: 33
- **Percentage**: ≈ 56%
- **Examples**:
    - "They need to make sure these systems work reliably in all conditions…"
    - "Prioritize safety over convenience…"
    - "Provide clear information on system limitations…"

Consumer concern regarding AI system safety together with reliability in vehicles stood as the dominating concern. Participants recognized the necessity for empirical testing that involves safety

back-ups with human intervention capabilities to guarantee AI systems perform properly in unpredictable situations. Customers need to understand AI system boundaries as a key measure to build trust between manufacturers and consumers.

- **Cybersecurity & Data Privacy**
  - **Mentions**: 28
  - **Percentage**: ≈ 47%
  - **Examples**:
    - "Implement strong cybersecurity measures…"
    - "Clear data usage policies and user consent…"
    - "Strict data encryption and access controls…"

These respondents indicated that ensuring cybersecurity and managing data privacy are crucial issues. For instance, many of the respondents indicated that there ought to be adequate measures to prevent hacking, there need to be policies on data usage, and user data must be protected encryption wise. The concern about AI data governance indicates the increasing worry towards the systems regarding the technologies sensitive collection, storage and processing of personal information.

- **Accessibility & Inclusiveness**
  - **Mentions**: 14
  - **Percentage**: ≈ 24%
  - **Examples**:
    - "Involve people with disabilities in the design process…"
    - "Make AI features more accessible to lower-income individuals…"
    - "Compatibility with existing assistive technologies…"

There was a clear call for making AI features more inclusive and accessible to all users, including individuals with disabilities and those from lower-income groups. Respondents emphasized the importance of involving diverse user groups in the design and testing process to ensure that AI systems meet the needs of everyone, regardless of ability or socioeconomic status.

- **Human Control & Oversight**
  - **Mentions**: 15
  - **Percentage**: ≈ 25%
  - **Examples**:
    - “AI should assist drivers, not replace them…”
    - “Always have a human override available…”

Respondents expressed strong support for human control in the presence of AI technologies. Many emphasized that AI should serve as an assistant to drivers, not as a replacement, and that drivers should always retain the ability to intervene or take over control when necessary. Ensuring human oversight was viewed as a key element in maintaining trust and safety.

- **Ethical AI & Transparency**
  - **Mentions**: 18
  - **Percentage**: ≈ 31%
  - **Examples**:
    - “Ensure transparency of AI decision-making…”
    - “Establish independent oversight for AI systems…”

Concerns about the ethics of AI for vehicles was another overarching theme where respondents sought to have transparency in the AI's decision making as well as independent audit supervision. AI ethics in the auto industry were considered vital to caring about the application of AI technologies because systems accepting algorithms should be unbiased and ethical.

- **Training & Education (for Users and Workers)**
  - **Mentions**: 10
  - **Percentage**: ≈ 17%
  - **Examples**:
    - “Provide clear and concise user manuals and tutorials…”
    - “Develop transition programs for affected workers…”

Educating and training were also pointed out as additional measures toward ensuring the responsible use of AI. It was mentioned that there should be proper driver education aimed at aiding users in correct use of AI components incorporated in the vehicle. Moreover. training the AI automation impacted workers was viewed as crucial in enabling the workforce shift positions with new responsibilities.

- **Regulation & Legal Frameworks**
  - **Mentions**: 11
  - **Percentage**: ≈ 19%
  - **Examples**:
    - "Establish clear liability and insurance protocols…"
    - "Work with policymakers for ethical AI practices…"

Many respondents advocated the formulation of additional policies and laws regulating the application of AI in vehicles. It was believed that responsible application of AI in cars would require defined responsibility clauses, adherence to consider industry practices, collaboration with legislation inventors, and sustain policies.

- **Sustainability & Environmental Focus**
  - **Mentions**: 6
  - **Percentage**: ≈ 10%
  - **Examples**:
    - "Focus on energy efficiency and sustainable materials…"
    - "Promote shared mobility and reduce the need for personal vehicles…"

The use of AI in vehicles was receiving more focus on its environmental issues. Some respondents proposed that automobile manufacturers focus more on reducing the carbon emission fuel powered AI cars by increasing energy conserving features, using ecofriendly materials, and encouraging car sharing.

- **Affordability & Availability of Simple Vehicles**
  - **Mentions**: 9
  - **Percentage**: ≈ 15%

- **Examples**:
    - "Still offer simple, reliable vehicles without excessive AI…"
    - "Make them affordable and easy to repair…"

Despite the increasing adoption of AI technologies, survey respondents preferred the option of affordable non-AI cars. As indicated, basic AI features are helpful, but auto manufacturers should continue to make vehicles that are straightforward, easy to maintain, and relatively inexpensive.

➢ **System Integration & Innovation**

- **Mentions**: 7
- **Percentage**: ≈ 12%
- **Examples**:
    - "Develop robust APIs and platforms for fleet management…"
    - "Develop offline functionality for critical features…"

Respondents also highlighted system integration and emerging innovations with respect to fleet management and rideshare platforms. They placed emphasis on critical offline functionalities and ensured that AI systems work in low connectivity areas.

This section summarizes the responsibilities for car manufacturers in relation to AI integration. Moving forward, by ensuring the civil application of technologies through frameworks of safety, reliability, transparency, verifiability, ethical practices, and AI accessibility-automakers will stand to enhance driving experiences and adequately address consumer needs while responsibly supporting societal concerns.

This chapter summarized the survey results and noted important patterns, user feedback, and the overall expectations of AI in the automotive sector. The results captured the current state of AI features integrated into vehicles and the anticipated future developments. Additionally, the data raised concerns with AI integration such as data privacy, dependability, and security risk concerns while highlighting concerns for responsible integration of AI by manufacturers. This analysis helps understand the perception that consumers have regarding AI technologies in vehicles while providing vital insights on how the industry should shape itself in the future.

5 Conclusion

This chapter offers an interpretation of findings summarized in Chapter 4, addressing the three research questions that guided this study. It addresses how AI is currently being used in the automotive sector, what developments lie in the future, and what car makers can do to capitalize on opportunities while avoiding pitfalls. Each research question is examined, outlining the relevant survey data and the conclusions reached regarding that question.

5.1 Answer to RQ1: How is AI used currently in the automotive industry and what is the impact of AI on the end-user level?

Chapter 4 introduces the general way AI is interpreted by the automotive industry transversally with respect to several features like voice assistants, adaptive cruise control, automated parking assistance and AI-powered navigation. The results highlight patchy adoption of AI features, with voice assistants the most used (45.1% of respondents). Other popular features are adaptive cruise control (33.8%), AI-powered navigation (38%) and automated parking assist (28.2%).

Users of these features are satisfied overall, though there are several areas of concern, according to the survey. For instance, 35.1% of respondents felt "somewhat satisfied" with AI features and 15.7% were dissatisfied. This means that AI features are not only improving the driving experience but also causing reliability issues with the fear of a broken system or a mistake.

In the question about the impact of AI on end-user, most of the participants (67.4%) agreed with the opinion that AI increases safety and comfort during driving, where 34.1% thought that AI makes remarkable improvement. However, 32.6% of those surveyed were neutral or thought that AI made little difference or had muddied the driving experience. Such mixed perceptions suggest that even though AI makes the life of many users better, there remains skepticism as well as need for more reliable, better implemented, and more educative models.

In short, AI, as is used today, is about improving vehicle functionality and providing a level of safety, but the user experience is mixed. On the end-user enhancement, the tech is still in progress of improvement especially on reliability and user experience, also, broader usability of the AI features.

5.2 Answer to RQ2: What could be possible in the future?

The Survey clearly shows that there is a strong Interest in the Future of the Automotive Industry in AI, and respondents expect several advancements as we move forward. Most respondents view fully autonomous vehicles (44.7%) and predictive traffic management powered by AI (58.3%) as the most exciting developments, indicating a future where AI systems will prominently drive safety, efficiency and driving experience. Other features they want are tailored AI-based in-car assistants (40.2%), implying that cars will become more customized according to the preferences of their drivers, in future.

AI health and fatigue monitoring (34.1%), and vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2X) (30.3%) smart communication are other potential advancements mentioned. These technologies might allow for improved safety on the road, real-time usage-based traffic assistance monitoring, and an optimization of driving based on health performance as well as environmental aspects. However, there was also skepticism with only a slight majority believing these advances would be common place in the next two decades, and even a split on the belief that one day this will be possible in the first place.

Overall, the automotive landscape is bright with futuristic AI revolutionizing the way individuals will drive, autonomous vehicles, predictive traffic management, personalized AI assistants are a huge leap. But it is still unclear when these improvements will be realized and widely adopted, as questions remain over their practicality and the regulatory and technological barriers they must overcome, according to some users.

5.3 Answer to RQ3: What should car makers do to take advantage of the future opportunities and mitigate the risk?

The results show that there are a number of important steps that car makers need to take in order to seize on the opportunities that AI presents while balancing the risks of its adoption. Respondents focused their most common recommendations on issues of safety, cybersecurity, data privacy and system reliability.

Over half of the respondents (56%) said that making sure AI systems were safe, reliable, and meaningfully tested in real-world conditions was the most important to them. They suggested add-

ing fail-safes, manual override options and defined limitations to the systems to avoid malfunctions. As car features increasingly become more steeped with AI, car makers cannot afford to lose sight of these necessities.

Cybersecurity and data privacy were also top of mind, with 47 percent of respondents highlighting the importance of robust data protection measures, including encryption, clear data usage policies and user consent. With the amount of data being collected by the AI systems in our cars, car makers will need to employ measures to protect user privacy and avoid any breaches of potential sensitive information.

Moreover, accessibility and inclusiveness were identified by respondents as being important variables for the responsible use of AI. Approximately 24% of respondents said that getting people with disabilities involved in the process of designing and testing products will bring forth AI features that are accessible to people of all needs. Also, car companies should keep making affordable cars for all different income classes, so that the technology from AI is accessible to all.

Car makers were also urged to retain human control and oversight by making AI an assistant to drivers rather than a substitute. One quarter of respondents (25%) said that drivers should always be able to intervene if they need to presumably to prevent disastrous outcomes.

Finally, respondents appeared to favor both ethical AI, as well as transparency in AI decision making. Manufacturers must explain and guarantee the development of AI systems, taking into account ethical focus and an independent overview in order to minimize operating bias.

To seize new opportunities and manage risks, as well as drive future value for consumers and society at large, car manufacturers should prioritize the implementation of safe, dependable, and secure AI systems, ensure accessibility, and champion ethical values. Manufacturers need to be willing to meet consumers where they are, reassure them, and, over time, do what it takes to make AI products both powerful and friendly to use.

This study investigated how AI is deployed in the automotive sector today, what developments are expected moving forward, and what measures automakers can take to facilitate responsible integration of AI technologies. Even though automotive AI technologies are still in their infancy, consumer interest and optimism about their evolution remains high. Concerns, however, continue to persist regarding privacy, safety, human drive, and driving skills.

To conclude, in order to take full advantage of the opportunities and challenges brought about by AI, automakers need to focus on safety, reliability, and education along with corporate social responsibility regarding the use of AI techs. Trust can be cultivated and a future where AI positively transforms the experience of driving can be achieved.

6 Discussion

This chapter engages in critical research analysis which deepens the explanation of Chapter 4 findings by relating them to theoretical concepts and practical business operations previously explored in the thesis. The goal of this examination is to analyze research quality and efficiency as well as its knowledge contribution while examining practical impacts for automotive sector entities. This section will disclose the limitations within the research together with recommended directions for future investigations. The analysis consists of four sections that begin with an evaluation of both outcome quality and procedural validity for the research methodology and data gathering and analysis techniques. Second, this section examines the study results in relation to previous research work to show both matches and differences. The practical recommendations implement fundamental insights into concrete actions for AI developers and automotive manufacturers. The analysis concludes with a section that presents both methodological restrictions of the research and proposes prospective paths for additional study.

6.1 Assessment of Result and Process Quality

This study implemented a planned systematic research path to carry out its entire cycle. Our main research aim focused on end-user perspectives regarding present-day artificial intelligence (AI) adoption in the automotive sector along with the essential role that data collection and analysis systems played in reaching this goal.

The phase dedicated to data collection proved highly successful. The research received 142 valid responses from survey participants providing superior results compared to the methodology's intended participant target of 120. Our participant diversity consisted of equal shares between those who owned cars and those who used them frequently and on special occasions. The varied characteristics within the sample made the results more applicable to everyday car users.

The research instrument combined quantitative survey sections using Likert scale and multiple choices to obtain statistical data and deep user feedback. The quantitative survey components allowed us to compare statistical data against user records for a more comprehensive study outcome.

The survey underwent preliminary testing on a test group composed of diverse participants with different demographic characteristics before full distribution began. The minor changes in wording came from their input which ultimately enhanced the questionnaire's overall quality and flow based on respondent feedback. The evaluation process helped enhance the instrument's validity because it helped respondents understand the survey questions in the same way.

The research process encountered several technical difficulties although its execution was successful. Although, we followed quantitative method, the main obstacle involved the validation process when interpreting qualitative data (Open ended questions). The structured approach to manual open-ended response coding in Excel despite the inherent interpretive challenges of qualitative information. Rigorous qualitative validation techniques would have been possible with advanced research software and inter-coder reliability checking but the research's qualitative findings remain limited in their formal verification.

The reliability levels across all quantitative questions surveyed proved to be solid. The consistent format of survey questions throughout the assessment revealed inner consistency which showed that participants provided well-considered responses to every question. Basic statistical analysis and visualization through Excel identified important patterns but the study would gain more value by employing advanced statistical tools during future implementation.

Online data collection through Google Forms demonstrated both positive and negative features which need to be considered. The fast distribution and wide reach of using internet platforms as a data collection method both benefited the study but simultaneously excluded users who lacked digital literacy and internet access. The study introduced minor technical sampling bias affecting more technologically advanced participants thus researchers should account for this limitation when analyzing the findings.

The research procedures managed to achieve appropriate structure alongside operational flexibility. The collected data had the appropriate amount crucial for addressing the research questions directly. The research objectives matched well with the established methodology then executed in

practice thus leading to reliable findings. The survey construction and participant enrollment together with data evaluation processes strictly supported the achievement of valid outcomes with reliable measures that also met ethical requirements.

The developed research process demonstrated high quality for its bachelor thesis scale while the obtained results delivered the expected information on how users handle AI technology in their vehicles alongside their projected expectations.

6.2 Theoretical Contributions

The study provides various important theoretical additions to AI research within automotive manufacturing. The study confirms important literature review findings through fresh data which helps develop new insights about AI integration for personal vehicles.

Through Chapter 2 the literature demonstrated how AI technologies presently transform automotive production as well as enhance user experience and predictive capabilities. The findings from Müller (2022) and Mandala (2022) demonstrated how AI contributes to smart factory establishment and supply chain optimization and higher product quality standards. The user data collected from our primary research of end-users did not emphasize industrial applications but these findings support such claims. Users were pleased with the easy navigation of adaptive cruise control and predictive maintenance alert features because those capabilities stem from AI manufacturing and vehicle design innovations.

The reviewed academic literature demonstrates the increasing demand for personalized automated solutions that deliver improved user experiences. Madapusi Sundar (2021) explained how manufacturers move toward smarter infotainment systems supplemented with adaptable comfort features as well as safety improvements enabled by Advanced Driver Assistance Systems (ADAS). Research users have confirmed these ideas by indicating voice assistants along with AI-powered navigation and safety features including adaptive cruise control and automated parking assist as their main usage and value points. The results showed that users reported highest satisfaction rates after engaging with AI features that provide convenience and safety benefits through their use. This confirms the literary descriptions about how user requirements match up with AI development progress.

The theoretical contribution of our study includes the observation of ongoing doubts that users express about particular AI advancements such as self-driving cars. Our findings create divergence regarding autonomous progress by contradicting optimistic literature predictions (Volkswagen AG & Leiden University, 1 C.E.). A large percentage of survey participants showed optimism toward autonomous driving yet nearly four out of ten respondents demonstrated their disagreement with autonomous cars becoming prevalent during the next two decades. The observed findings create a real-world reference point regarding optimistic statistical predictions which reveals a demand for greater attention to build trust alongside ethical transparency in addition to developing transition-specific usability.

Users significantly contributed to defining ethical AI development principles as well as inclusive AI frameworks. Research authors Demlehner (2022) explore theoretical aspects of algorithmic ethics and data security yet our respondents directly expressed privacy-related concerns combined with cybersecurity risks and job loss potential and AI dependence. The empirical observations about utilization match academic ideas but ground the theoretical concepts in user experiences. The study participants highlighted issues regarding inclusivity and affordability because these aspects received less emphasis in previous research thus expanding future investigation into social and economic dimensions of AI acceptance.

The research findings here confirm many established academic findings by validating the existing advantages of AI along with its upcoming possibilities. The research adds depth to the discussion while bringing important user-generated data about trust deficiencies as well as ethical doubts and autonomy-readiness levels. The identified contributions establish the foundation for improved theoretical AI adoption models through the incorporation of psychological user factors alongside cultural and practical implementation barriers.

6.3 Practical Contributions

This research not only helps business practitioners at automotive companies but also product developers and innovation managers understand how AI integration can happen throughout their vehicles in user-focused sustainable formats.

The research directly reveals that customers are receptive to AI technologies although they maintain an admirable degree of reservation. Experimental automotive organizations should understand that AI features including voice assistants and adaptive cruise control and navigation systems find approval from customers, but numerous users show hesitancy when it comes to autonomous vehicle functions. Companies should focus on slow and clear implementations of AI technology instead of launching futuristic solutions that exceed user trust capabilities.

AI practitioners should direct their investments toward creating AI systems which work with human intervention as opposed to taking over their responsibilities. Users clearly stated during the research interviews that Artificial Intelligence solutions should assist human decisions instead of completely removing human intervention from the process. High levels of user confidence exist alongside usability when introducing innovative technologies.

Results from the survey showed accessibility alongside inclusiveness should become strategic industrial targets. The research participants noted the important requirement to develop AI features that adapt to users with disabilities and lower-income backgrounds. Manufacturer adoption of adaptable features which meet different budget ranges allows them to reach broader markets and build loyal customer bases. Inclusive design moves forward through simple design elements which include voice-activated controls and simplified system interfaces and assistive device compatibility.

Market researchers and product strategists can gain meaningful direction from this study data regarding the potential price consumers will pay for AI product capabilities. A substantial number of respondents indicated their willingness to purchase automobiles with AI features at premium prices though a similar portion disliked this practice and considered these characteristics indispensable during purchase. The market enables manufacturers to introduce a package structure that includes essential AI safety features within all models and advanced automation or customization options available at premium trim levels. This method suits consumers focused on value along with individuals who lead innovation trends.

Research collected from the study indicates businesses must use AI as a complete value proposition embracing ethical responsibility combined with environmental sustainability goals and social

trust commitments. Consumer trust will build for brands which integrate their AI plans directly with consumer values such as safety measures and transparent practices and environmental sustainability commitments.

The practical insights from this study provide industrial professionals a real business perspective on how users react to automotive AI thereby helping organizations identify the best optimization areas and risk mitigation strategies and key user requirements. A user-driven design methodology based on this research enables automotive manufacturers to generate vehicles which combine intelligence with safety features while remaining desirable to future drivers.

6.4 Limitations of the Study and Future Directions

While this research offers some valuable insights into AI adoption and customer sentiment in the automotive sector, there are several limitations that need to be acknowledged.
These are largely contextual boundaries, methodological scope, and rapid technological advancement, all of which can affect generalizability and longevity of findings. To build on this foundation, future research should explore broader geographical contexts, long-term user sentiment, and deeper psychological factors affecting trust in AI systems.

6.4.1 Contextual Limitations

Firstly, this research took place in February 2025 when numerous industries rapidly implemented AI technologies. The collected perceptions and experiences during the research period provide information that reflects temporary conditions. User opinions together with AI knowledge and adoption patterns could shift dramatically throughout the upcoming few years considering the rapid progress of automotive technology. The investigation's time-dependent nature indicates its factual accuracy during this moment even though contemporary technology trends could alter its value as future advancements develop.

Secondly, results become less applicable across all situations because the survey targeted participants specifically from Finland with particular cultural backgrounds. Most participants share similar social and economic characteristics with each other because they primarily reside in locations

that have accessible AI-equipped vehicles. The study results could not adequately address users' perspectives throughout developing nations and rural regions along with settings that lack substantial exposure to automotive artificial intelligence. Future research about AI-equipped vehicles should expand its focus to include international populations because cultural views toward technology along with trust and automated systems show significant variances across different regions.

Thirdly, the study's research targeted individual private auto users while omitting essential stakeholders who manage vehicle fleets and commercial drivers as well as automotive maintenance personnel. Different stakeholder groups hold unique requirements and expectations about AI implementation particularly in domains such as logistics operations and predictive maintenance as well as extensive transport system AI implementation.

6.4.2 Methodological Limitations

The research methodology that utilized structured quantitative surveys along with open-ended questions created quantifiable depth but sent underlying methodological flaws throughout the study. The systematic approach to manual coding of qualitative data suffers from possible researcher bias due to the subjective interpretation process. Some thematic findings could be considered less analytically rigorous because there were no inter-coder reliability checks or advanced qualitative analysis software applications (NVivo) employed for the analysis.

Statistically speaking the 142 survey participants provide valid data for such study purposes but insufficient numbers restrict the researcher from conducting detailed subgroup analysis about demographic factors like age groups and educational attainment among others. The analysis of population breakdowns would have received more attention from researchers if we had access to a bigger research data set.

6.4.3 Future Research Directions

The research has multiple promising scenarios for development:

1. **Wider Scope & Cultural Diversity**

   Future research should gather responses from various countries because it aims to acquire worldwide perspective on how the automotive industry views AI technologies. This study should include participants from multiple countries so that cultural biases can be minimized and global AI trust perceptions differences alongside technology adoption trends can be properly investigated.

2. **Deeper Qualitative Insights**

   The research design includes focus group discussions and one-to-one interviews which allows investigators to retrieve comprehensive narratives regarding user trust and ethical elements and regular AI functionality. The obtained level of detail would uncover deeper user motivation factors beyond survey capabilities.

3. **Longitudinal Studies**

   A time-spanning analysis that follows AI public opinion change during three to five successive annual time periods would showcase the effects that prolonged technological exposure and maturation have on social acceptance.

4. **Comparative Studies**

   An effective approach would involve comparing user perspectives with those from AI engineering and automotive design professionals together with safety regulation authorities and marketing executives. Such analysis would show if the desired user needs synchronized with industry product development.

5. **Focus on Specific AI Features**

   Future studies should focus on particular AI advancements involving autonomous driving and predictive maintenance and in-car customization to conduct comprehensive investigations about adoption challenges and user experiences and potential enhancement prospects.

6. **Impact Assessment on Business Models**

   Additional research should explore AI user expectations to determine their impact across automotive business operations from product planning to post-sale maintenance and pricing structures. Users must determine whether they prefer to receive AI software updates cost-free through patches or they would accept paid subscription services for enhanced AI capabilities.

References

Ammar, M., Haleem, A., Javaid, M., Bahl, S., Garg, S. B., Shamoon, A., & Garg, J. (2022). Significant applications of smart materials and Internet of Things (IoT) in the automotive industry. *Materials Today Proceedings*, *68*, 1542–1549. https://doi.org/10.1016/j.matpr.2022.07.180

Arena, F., Collotta, M., Luca, L., Ruggieri, M., & Termine, F. G. (2021). Predictive maintenance in the automotive sector: A literature review. *Mathematical and Computational Applications*, *27*, 2. https://doi.org/10.3390/mca27010002

Bharadiya, J. P., a, Thomas, R. K., Ahmed, F., University of the Cumberlands, Swiss School of Business and Management, & Mid Sweden University. (2023). Rise of artificial intelligence in business and industry. *Journal of Engineering Research and Reports*, *25*(3), 85–103. https://doi.org/10.9734/JERR/2023/v25i3893

Demlehner, Q. (2022). *Artificial Intelligence and its Use for (Automotive) manufacturing purposes – Strategic Applicability and associated adoption challenges*. https://open.fau.de/handle/openfau/17868

Judijanto, L., & Vandika, A. (2024). The Effect of IoT Implementation and Artificial Intelligence in Optimising Machine Maintenance in the Automotive Industry in Karawang. *Sciences Du Nord Nature Science and Technology*, *1*, 76–85.

Llopis-Albert, C., Rubio, F., & Valero, F. (2021). Impact of digital transformation on the automotive industry. *Technological forecasting and social change*, *162*, 120343.

Madapusi Sundar, S., & Madapusi Sundar, S. (2021). *Evaluating the impact of AI-based personalization of automotive user interfaces in Fully Autonomous Vehicles* (thesis). *Evaluating the impact of AI-based personalization of automotive user interfaces in fully autonomous vehicles*.

Mandala, V. (2022). REVOLUTIONIZING ASYNCHRONOUS SHIPMENTS: INTEGRATING AI PREDICTIVE ANALYTICS IN AUTOMOTIVE SUPPLY CHAINS. *IAEME*, *1*(1), 47–59. https://doi.org/10.17605/OSF.IO/FTXEV

Moniz, A. B., Jr., Candeias, M., & Boavida, N. (2022). Changes in productivity and labour relations: artificial intelligence in the automotive sector in Portugal. In CICS.NOVA, *Int. J. Automotive Technology And Management* (Vol. 22, Issue 2, pp. 222–244).

Müller, C. (2022). *AI models and methods in automotive manufacturing: a systematic literature review*. https://epub.fh-joanneum.at/obvfhjhs/content/titleinfo/7847888/full.pdf

Nazim, I. (2021). IMPACT OF ARTIFICIAL INTELLIGENCE IN AUTOMOTIVE INDUSTRIES TRANSFORMATION. *ResearchGate*. https://doi.org/10.24924/ijise/2021.04/v9.iss2/01.35

Pillaia, R., & Sivathanu, B. (2022). Adoption of AI-empowered industrial robots in auto component manufacturing companies. *Production Planning and Control*, *33*(16), 1517–1533. https://centaur.reading.ac.uk/93387/

Salian, D. (2023). Review of digitalization using artificial intelligence maturity models: The case of american automotive smes. *Soft Computing, Artificial Intelligence and Applications*, 35–44. https://doi.org/10.5121/csit.2023.132404

Tubaro, P., & Casilli, A. A. (2019). Micro-work, artificial intelligence and the automotive industry. *Journal of Industrial and Business Economics*, *46*(3), 333–345. https://doi.org/10.1007/s40812-019-00121-1

Volkswagen AG & Leiden University. (1 C.E.). Artificial intelligence and data science in the automotive industry. In *JOURNAL TITLE - MONTH YEAR*.

Bell, E., & Bryman, A. (2007). The ethics of management research: an exploratory content analysis. *British Journal of Management*, 18(1), 63–77.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101.

Bryman, A., & Bell, E. (2015). *Business Research Methods* (4th ed.). Oxford University Press.

Creswell, J. W. (2014). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (4th ed.). SAGE Publications.

Fink, A. (2013). *How to Conduct Surveys: A Step-by-Step Guide* (5th ed.). SAGE Publications.

Saunders, M., Lewis, P., & Thornhill, A. (2019). *Research Methods for Business Students* (8th ed.). Pearson Education Limited.

Appendices

Appendix 1. Questionnere

- Do you own or frequently use a car?
- What type of vehicle do you primarily use?
- How familiar are you with AI features in cars?
- Which AI-powered car features have you used or experienced?
- How would you rate your satisfaction with AI-driven car features?
- Do you think AI improves safety and driving comfort?
- What challenges or concerns do you have regarding AI in cars?
- Which AI advancements do you expect to see in cars within the next decade?
- Would you trust a fully self-driving car without human intervention?
- Do you believe AI-driven cars will replace traditional vehicles in the next 20 years?
- What excites you most about AI in future cars?
- What should automakers prioritize when developing AI-powered vehicles?
- Would you pay extra for a car with advanced AI features?
- What concerns do you have about automakers integrating AI into vehicles?
- In your opinion, what steps should car makers take to ensure responsible AI adoption?