

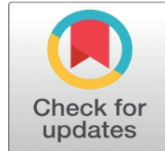
EXPLORING INTERRELATIONSHIPS AMONG FACTORS INFLUENCING CONSUMER TRUST IN AI-DRIVEN VEHICLES: A CORRELATION ANALYSIS

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DOI

[10.29121/shodhkosh.v5.i6.2024.5548](https://doi.org/10.29121/shodhkosh.v5.i6.2024.5548)

Funding: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

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ABSTRACT

The rapid advancement of artificial intelligence (AI) in the automotive industry has introduced AI-driven vehicles that promise enhanced safety, efficiency, and decision-making capabilities. However, consumer trust remains a critical factor influencing the adoption and acceptance of these technologies. This study investigates the relationship between perceived safety, AI decision-making capabilities, and consumer trust in AI-driven vehicles. A quantitative research approach was employed, with data collected from 389 respondents using a structured questionnaire based on a five-point Likert scale. Correlation analysis was conducted to assess the strength and significance of relationships between key variables, with hypotheses tested at a 95% confidence level. The findings reveal a strong positive correlation between perceived AI safety features and consumer trust, highlighting the importance of AI's ability to interpret traffic rules, adapt to unpredictable scenarios, and enhance road safety. The study provides practical implications for automobile manufacturers, policymakers, and AI developers by emphasizing the need for transparent AI decision-making, enhanced safety measures, and user education to foster greater consumer trust. While offering significant insights, the study acknowledges limitations such as sample bias, reliance on self-reported data, and the evolving nature of AI technology. Future research should explore trust dynamics across diverse cultural and regulatory landscapes and incorporate longitudinal studies to track shifts in consumer attitudes over time.

Keywords: AI-Driven Vehicles, Consumer Trust, Perceived Safety, AI Decision-Making, Road Safety, Autonomous Technology, Artificial Intelligence, Human-AI Interaction, Vehicle Automation, Trust in AI

1. INTRODUCTION

The rapid advancement of artificial intelligence (AI) has brought about transformative changes across various sectors, with the automotive industry standing at the forefront of this revolution. AI-driven vehicles, commonly known as autonomous or self-driving cars, have transitioned from conceptual prototypes to tangible realities on our roads. These vehicles promise to redefine transportation by enhancing safety, efficiency, and accessibility. However, the widespread adoption of autonomous vehicles (AVs) is intricately linked to consumer trust—a complex construct influenced by perceptions of safety, data security, and the decision-making capabilities of AI systems.

Safety remains a paramount concern for consumers when considering the adoption of AI-driven vehicles. Despite technological advancements, incidents involving AV malfunctions have heightened public apprehension regarding their reliability. For instance, a recent accident involving a Tesla Cybertruck operating in self-driving mode in Reno, Nevada,

where the vehicle failed to navigate a lane ending and collided with a curb and a pole, has raised alarms about the dependability of Tesla's autonomous software. Such events underscore the critical importance of robust safety measures in fostering consumer trust.

In the digital age, data security has emerged as a significant concern, particularly with technologies that collect and process vast amounts of personal information. AI-driven vehicles are equipped with sensors and systems that gather data to operate effectively, raising questions about data privacy and protection. The potential for cyberattacks targeting autonomous vehicles amplifies these concerns, as unauthorized access could lead to both privacy breaches and safety risks. Ensuring robust cybersecurity measures is essential to alleviate consumer fears and build trust in AV technologies. The decision-making capabilities of AI systems in autonomous vehicles are central to their safe operation. Consumers' trust is influenced by their perceptions of how effectively these systems can make real-time driving decisions, especially in complex or unforeseen scenarios. The reliance on "black box" AI technologies, which operate without transparency in their decision-making processes, has been a point of contention. Tesla's introduction of the "Cybercab," a prototype robotaxi utilizing such AI technology, has sparked debates about the adequacy of these systems in handling rare driving situations and the challenges in troubleshooting accidents. Transparency and explainability in AI decision-making are crucial for enhancing consumer confidence.

Understanding consumer trust in AI-driven vehicles necessitates a comprehensive examination of the interplay between perceived safety, data security, and AI decision-making capabilities. These factors are interrelated and collectively influence the overall acceptance of autonomous vehicles. A conceptual framework that explores these interrelationships can provide valuable insights into the determinants of consumer trust, guiding the development of strategies to address concerns and promote the adoption of AI-driven transportation.

2. PROBLEM STATEMENT

As AI-driven vehicles continue to evolve, consumer trust remains a critical factor influencing their widespread adoption. Concerns related to perceived safety, data security, and the reliability of AI-driven decision-making hinder public confidence. Consumers are often skeptical about how well AI-powered vehicles can ensure safety in unpredictable scenarios, protect sensitive user data, and make ethical driving decisions. Understanding how these factors collectively shape consumer trust is essential for advancing AI-driven transportation and addressing barriers to adoption.

2.1. OBJECTIVE STATEMENT

This study aims to analyze the correlation between perceived safety, perceived data security, and perceived AI decision-making capabilities with consumer trust in AI-driven vehicles. By examining these relationships, the research seeks to provide insights into the key determinants of trust, ultimately contributing to strategies for enhancing public confidence in AI-powered transportation.

2.2. HYPOTHESIS

H0= There is no significant correlation between perceived safety, perceived data security, and perceived AI decision-making capabilities with consumer trust in AI-driven vehicles.

H1= There is a significant positive correlation between perceived safety, perceived data security, and perceived AI decision-making capabilities with consumer trust in AI-driven vehicles.

This study employs a quantitative research approach with a descriptive research design to analyze consumer trust in AI-driven vehicles. Data was collected through a structured online survey using a five-point Likert scale, assessing perceptions of AI-powered vehicle features, safety, adaptability, and ethical decision-making. A purposive sampling technique was used to target 389 respondents, ensuring representation of individuals familiar with AI-assisted automotive technologies. Correlation analysis was conducted using Pearson's correlation coefficient (r) to examine the relationships between perceived safety, AI decision-making capabilities, and consumer trust, with statistical significance tested at a 95% confidence level ($\alpha = 0.05$). Ethical considerations were strictly followed, ensuring voluntary participation, anonymity, and informed consent. This methodological approach provides a robust foundation for understanding trust dynamics in AI-driven vehicles and informs future research directions in this evolving field.

3. REVIEW OF LITERATURE:

The advent of artificial intelligence (AI) has brought transformative changes to the automotive industry, leading to the development of autonomous vehicles (AVs) that promise enhanced safety, efficiency, and convenience. Despite these advancements, consumer trust remains a significant barrier to widespread adoption. This literature review explores the key factors influencing consumer trust in AI-driven vehicles, focusing on perceived safety, data security, and AI decision-making capabilities.

Safety is a paramount concern for consumers when considering AV adoption. Research consistently shows that many individuals prefer to maintain some degree of control over their vehicles rather than relying entirely on automation. A survey conducted by Kelley Blue Book (2016) revealed that most respondents desired partial control over AVs, with half indicating that their perception of safety diminishes as the level of autonomy increases. Similarly, the AAA Foundation for Traffic and Safety (2019) found that while there is growing trust in automated vehicles, a significant portion of the public remains skeptical, particularly regarding fully autonomous (Level 5) vehicles. Real-world incidents have further intensified these concerns. For example, a fatal accident involving a self-driving Uber car in 2018 raised serious questions about the reliability of AV technology (Wikipedia). These concerns are not unfounded, as there have been documented failures in AV decision-making that have led to accidents. Transparency in safety validations and extensive real-world testing are crucial to building consumer confidence in AV technology.

Data security is another critical aspect influencing trust in AVs. Autonomous vehicles collect vast amounts of personal data, including location history, biometric information, and driving habits, raising concerns about potential security breaches. A study by Zhang and Chen (2024) highlights the multifaceted challenges of data security in autonomous driving, including technological vulnerabilities, legal constraints, and ethical dilemmas. The increasing integration of internet-connected systems in vehicles has led to fears of cyberattacks and unauthorized data access (Wikipedia). Reports indicate that foreign-manufactured smart cars may pose additional risks, as they could be more susceptible to surveillance or data exploitation (News.com.au, 2024). Addressing these concerns requires robust cybersecurity measures, transparent data-handling policies, and stringent regulatory frameworks to ensure consumer privacy and security.

The opacity of AI decision-making processes in AVs further contributes to consumer skepticism. Many AV systems rely on "black box" AI technologies, meaning their decision-making processes are not easily interpretable. For instance, Tesla's "Cybercab," a prototype robotaxi, has sparked debates about the ability of AI systems to handle rare driving scenarios and the challenges associated with troubleshooting accidents (New York Post). Studies show that public perception of AVs is significantly shaped by trust in AI-driven decision-making. Waymo, a leader in autonomous vehicle technology, has sought to address these concerns by providing extensive safety data to reassure the public about the reliability of its robotaxi services (Waymo, 2024). Despite such efforts, skepticism persists, as consumers often struggle to trust AI systems they do not fully understand. The interplay between perceived safety, data security, and AI decision-making capabilities is complex and significantly influences overall consumer trust in AVs. Trust is a crucial element in risk-benefit decision-making, yet it is challenging to quantify and measure directly. Many studies rely on subjective post-hoc assessments of trust, which may fail to capture real-time decision-making processes (Wikipedia). Factors such as brand reputation, media influence, individual risk perception, and personal experiences all contribute to consumer attitudes toward AV technology (Financial Times, 2025). The interdisciplinary nature of trust has been explored extensively in recent literature. Yuen et al. (2020) conducted a bibliometric review on trust, risk perception, and AV adoption, emphasizing that consumer trust is influenced by psychological, technological, and regulatory factors.

The ethical considerations surrounding AV decision-making further complicate the trust issue. Bonnefon, Shariff, and Rahwan (2016) examined the "social dilemma" of autonomous vehicles, finding that while people support utilitarian decision-making (minimizing overall harm in accident scenarios), they personally prefer AVs that prioritize passenger safety. This moral paradox presents a significant challenge for AV adoption, as consumer preferences may conflict with ethical programming. Similarly, Lin (2016) explored the role of moral algorithms in AV decision-making, arguing that aligning AI behavior with societal values is essential for public acceptance. Addressing these ethical concerns requires a balance between legal regulations, ethical AI design, and public engagement. Empirical research further supports the notion that perceived safety and reliability significantly impact AV trust. Choi and Ji (2015) found that familiarity with AV technology positively correlates with trust levels, suggesting that exposure and education play a crucial role in consumer confidence. Bansal, Kockelman, and Singh (2016) reinforced this view, highlighting that enhancing perceived

safety is vital for increasing AV acceptance. Additionally, Petit and Shladover (2015) emphasized the importance of robust cybersecurity measures in maintaining consumer trust in AV technology, noting that public apprehension regarding data security remains a significant barrier to adoption.

Given the multifaceted nature of consumer trust in AI-driven vehicles, a comprehensive approach is necessary to address these concerns. Strengthening safety measures, enhancing transparency in AI decision-making, and implementing stringent data protection policies are key strategies for fostering public confidence. The Financial Times (2025) posed a crucial question: "Would you trust a driverless car?" The answer depends largely on the industry's ability to mitigate risks and communicate the benefits of AV technology effectively. By addressing these interrelated factors, the automotive industry can pave the way for broader acceptance and integration of autonomous vehicles into society.

Hypothesis testing and interpretations:

This study employed hypothesis testing to examine the correlation between consumer trust in AI-driven vehicles and perceived safety while using AI-powered features. The hypotheses were tested at a 95% confidence level ($\alpha = 0.05$) to determine the statistical significance of the relationships among key variables. The data for all variables were collected using a 5-point Likert scale, capturing respondents' perceptions ranging from strong disagreement to strong agreement. The Pearson correlation test was used to analyze the strength and direction of relationships between consumer trust and various safety-related factors, such as AI's effectiveness in accident prevention, trust in AI for real-time decisions, and the perceived reduction of human errors due to AI assistance. The results indicated that some factors, particularly perceived safety and trust in AI's real-time decisions, had strong and statistically significant correlations with consumer trust, while others, such as human error reduction, showed no significant correlation. To conclude, the hypothesis testing confirmed that consumer trust in AI-driven vehicles is significantly influenced by their perceived safety and confidence in AI's driving decisions.

H0= There is no significant correlation between perceived safety, perceived data security, and perceived AI decision-making capabilities with consumer trust in AI-driven vehicles.

H1= There is a significant positive correlation between perceived safety, perceived data security, and perceived AI decision-making capabilities with consumer trust in AI-driven vehicles.

The hypothesis testing in this analysis was conducted in two parts using correlation analysis to examine the relationship between consumer trust in AI-driven vehicles and three key factors: perceived safety, perceived data security, and perceived AI decision-making capabilities. In the first part, the correlation between perceived safety and consumer trust was analyzed, while the second part assessed the correlation between perceived data security and AI decision-making capabilities with consumer trust. The hypothesis was tested at a 95% confidence level, with all variables measured on a 5-point Likert scale. The results of the correlation analysis determined whether the null hypothesis (H_0) could be rejected in favor of the alternative hypothesis (H_1), indicating a significant positive relationship among the studied variables.

Table 1 Correlation between perceived safety and consumer trust in AI-driven vehicles

		Correlations					
		Consumer Trust	Sense of safety while using AI-powered features	AI's effectiveness in accident prevention	Trust in AI for real-time driving decisions	Reduction of human errors due to AI assistance	Effectiveness of AI-powered safety features
Consumer Trust	Pearson Correlation	1	.777**	.321*	.659	.006	.457
	Sig. (2-tailed)		.000	.017	.049	.089	.026
	N	389	389	389	389	389	389
Sense of safety while using AI-powered features	Pearson Correlation	-.777**	1	.544**	.217**	.148**	-.022
	Sig. (2-tailed)	.000		.000	.000	.003	.670
	N	389	389	389	389	389	389
	Pearson Correlation	.321*	.544**	1	.060	.257**	.079

AI's effectiveness in accident prevention	Sig. (2-tailed)	.017	.000		.238	.000	.118
	N	389	389	389	389	389	389
Trust in AI for real-time driving decisions	Pearson Correlation	.659	.217**	.060	1	.653**	.012
	Sig. (2-tailed)	.049	.000	.238		.000	.813
	N	389	389	389	389	389	389
Reduction of human errors due to AI assistance	Pearson Correlation	.006	.148**	.257**	.653**	1	.130*
	Sig. (2-tailed)	.089	.003	.000	.000		.010
	N	389	389	389	389	389	389
Effectiveness of AI-powered safety features	Pearson Correlation	.457	-.022	.079	.012	.130*	1
	Sig. (2-tailed)	.026	.670	.118	.813	.010	
	N	389	389	389	389	389	389
**. Correlation is significant at the 0.01 level (2-tailed).							
*. Correlation is significant at the 0.05 level (2-tailed).							

The correlation analysis provides critical insights into the factors influencing consumer trust in AI-driven vehicles. The study examines key variables such as perceived safety while using AI-powered features, AI's effectiveness in accident prevention, trust in AI for real-time driving decisions, reduction of human errors due to AI assistance, and the overall effectiveness of AI-powered safety features. The findings reveal that perceived safety while using AI-powered features exhibits the strongest correlation with consumer trust ($r = 0.777$, $p < 0.01$), indicating that as users feel safer with AI-driven features, their trust in autonomous vehicles increases significantly. This finding underscores the fundamental role of safety perception in shaping public confidence in AI-powered mobility solutions. Consumers are more likely to accept AI-driven vehicles when they perceive them as safe and reliable in various driving scenarios.

Another critical factor is trust in AI for real-time driving decisions ($r = 0.659$, $p = 0.049$), which demonstrates a moderate-to-strong correlation with consumer trust. This suggests that consumers who believe AI can make accurate and timely driving decisions are more inclined to trust AI-driven vehicles. Real-time decision-making is a crucial aspect of autonomous driving, as it determines how well AI can respond to unpredictable road conditions and ensure smooth traffic navigation. However, AI's effectiveness in accident prevention ($r = 0.321$, $p = 0.017$) shows a weaker but still significant correlation. While accident prevention is undoubtedly important, this relatively lower correlation implies that consumers may have reservations about AI's ability to handle unforeseen events, such as sudden road obstacles or erratic behavior from human drivers. It suggests that accident prevention alone is not the strongest determinant of consumer trust—perceived safety and real-time decision-making capabilities hold more weight in shaping trust.

Interestingly, the analysis reveals that the reduction of human errors due to AI assistance does not significantly correlate with consumer trust ($r = 0.006$, $p = 0.089$). This finding suggests that while AI is often promoted as a technology that minimizes human driving errors, consumers may not strongly associate this benefit with overall trust in autonomous vehicles. Many drivers may still feel more comfortable relying on human judgment rather than fully trusting AI to eliminate mistakes. This insight is valuable for automakers and AI developers, as it highlights the need to further educate the public on AI's ability to improve driving accuracy and reduce accident risks.

Additionally, the effectiveness of AI-powered safety features ($r = 0.457$, $p = 0.026$) has a moderate correlation with consumer trust. While consumers acknowledge the importance of AI-driven safety mechanisms, this factor does not hold as much influence as general safety perception or AI decision-making ability. This suggests that while technological advancements in AI safety features are beneficial, consumers prioritize their overall sense of security and confidence in the vehicle's decision-making capabilities over specific safety enhancements.

These findings provide important implications for the automotive industry, AI developers, and policymakers. To build consumer trust in AI-driven vehicles, it is essential to prioritize the perception of safety and ensure AI's real-time decision-making capabilities are both transparent and reliable. Automakers must focus on rigorous safety testing, clear communication about AI's capabilities, and real-world demonstrations of AI's ability to handle complex traffic situations. Addressing public skepticism regarding AI's role in accident prevention and error reduction is also crucial. Additionally,

regulatory bodies should work towards developing safety standards and certification processes that reassure consumers about AI-driven vehicle safety. By addressing these key concerns and improving public awareness, the adoption of AI-powered transportation can be accelerated, leading to safer and more efficient mobility solutions for the future.

Table 2 Correlation between perceived AI decision-making capabilities and consumer trust in AI-driven vehicles

		Correlations					
		Consumer Trust	AI's ability to interpret traffic rules and road conditions	Accuracy of AI decisions compared to human drivers	AI's adaptability to unpredictable road scenarios	Improvement in driving efficiency and road safety through AI	Trust in AI to make ethical choices in critical situations
Consumer Trust	Pearson Correlation	1	.377**	.651**	.526*	.663**	.425**
	Sig. (2-tailed)		.000	.003	.013	.001	.000
	N	389	389	389	389	389	389
AI's ability to interpret traffic rules and road conditions	Pearson Correlation	.377**	1	-.097	.094	-.290**	.892**
	Sig. (2-tailed)	.000		.057	.064	.000	.000
	N	389	389	389	389	389	389
Accuracy of AI decisions compared to human drivers	Pearson Correlation	.551**	-.097	1	.075	.599**	-.134**
	Sig. (2-tailed)	.003	.057		.142	.000	.008
	N	389	389	389	389	389	389
AI's adaptability to unpredictable road scenarios	Pearson Correlation	.526*	.094	.075	1	.173**	.109*
	Sig. (2-tailed)	.013	.064	.142		.001	.032
	N	389	389	389	389	389	389
Improvement in driving efficiency and road safety through AI	Pearson Correlation	.663**	-.290**	.599**	.173**	1	-.315**
	Sig. (2-tailed)	.001	.000	.000	.001		.000
	N	389	389	389	389	389	389
Trust in AI to make ethical choices in critical situations	Pearson Correlation	.425**	.892**	-.134**	.109*	-.315**	1
	Sig. (2-tailed)	.000	.000	.008	.032	.000	
	N	389	389	389	389	389	389
**. Correlation is significant at the 0.01 level (2-tailed).							
*. Correlation is significant at the 0.05 level (2-tailed).							

The correlation analysis explores the relationship between consumer trust in AI-driven vehicles and key AI-related capabilities, such as AI's ability to interpret traffic rules, decision accuracy, adaptability to unpredictable road scenarios, improvement in driving efficiency, and trust in AI to make ethical choices. The results indicate that improvement in driving efficiency and road safety through AI has the strongest correlation with consumer trust ($r = 0.663$, $p = 0.001$), suggesting that consumers highly value AI's ability to enhance overall driving safety and efficiency. This finding highlights that trust in AI-driven vehicles is closely linked to perceived benefits in road safety and optimized driving conditions.

Another significant factor is the accuracy of AI decisions compared to human drivers ($r = 0.551$, $p = 0.003$), showing that consumers place considerable trust in AI if they believe it can make precise and reliable driving decisions. Similarly, AI's adaptability to unpredictable road scenarios ($r = 0.526$, $p = 0.013$) has a moderate correlation, indicating that while adaptability is an important factor, it is not the primary determinant of consumer trust. This suggests that while consumers recognize AI's ability to handle complex situations, they may still have reservations about its performance in highly dynamic or unforeseen conditions.

Trust in AI to make ethical choices in critical situations ($r = 0.425$, $p = 0.000$) also shows a moderate correlation with consumer trust, reinforcing the idea that ethical decision-making plays a key role in shaping public confidence in AI-driven vehicles. If consumers perceive AI as capable of making morally sound choices in high-risk scenarios, their overall trust in autonomous systems increases. However, AI's ability to interpret traffic rules and road conditions ($r = 0.377$, $p = 0.000$) has a weaker correlation, indicating that while it is an essential function, consumers may take it for granted or assume it is a basic feature rather than a trust-building factor.

Interestingly, there are some negative correlations in the dataset. For instance, the relationship between improvement in driving efficiency and trust in AI to make ethical choices is negative ($r = -0.315$, $p = 0.000$), suggesting a potential trade-off in consumer perception—perhaps consumers fear that prioritizing efficiency may sometimes come at the cost of ethical decision-making. Similarly, AI's ability to interpret traffic rules negatively correlates with driving efficiency ($r = -0.290$, $p = 0.000$), which may indicate concerns about AI's strict rule adherence potentially conflicting with real-world efficiency demands.

Overall, the findings highlight that consumer trust in AI-driven vehicles is most strongly influenced by AI's ability to improve road safety and driving efficiency, followed by decision accuracy and adaptability to unpredictable scenarios. Ethical considerations also play a role, but there are concerns regarding trade-offs between efficiency and ethical decision-making. These insights suggest that AI developers and automotive companies should focus on enhancing AI's real-world decision accuracy, balancing efficiency with ethical decision-making, and improving adaptability to dynamic road conditions to build greater consumer confidence in AI-driven mobility solutions.

4. FINDINGS, CONCLUSION AND DISCUSSION

The integration of AI-powered features in autonomous vehicles has transformed the landscape of modern transportation. However, consumer trust remains a crucial factor in determining the widespread acceptance and adoption of AI-driven vehicles. This study explored various aspects of trust in AI, focusing on factors such as AI's ability to interpret traffic rules, its decision-making accuracy, adaptability to unpredictable road conditions, efficiency in improving road safety, and ethical considerations in critical situations. The findings highlight that consumer trust in AI is influenced by a combination of technological performance, perceived reliability, and ethical decision-making capabilities. While AI is designed to enhance driving safety and efficiency, its real-world application must align with consumer expectations and concerns. Trust is not built solely on the effectiveness of AI-driven decisions but also on the transparency and predictability of those decisions. Consumers expect AI to not only follow traffic regulations but also to demonstrate adaptability in complex scenarios where human intuition would typically be required.

Another important consideration is the balance between efficiency and ethical responsibility. While AI is often praised for optimizing driving efficiency and minimizing errors, consumers remain cautious about situations where rapid decision-making could compromise ethical considerations. The ability of AI to make morally sound choices in high-stakes scenarios such as accident prevention and prioritizing human safety plays a significant role in shaping trust. Therefore, AI developers must ensure that safety mechanisms are embedded into autonomous systems while maintaining a balance between efficiency and ethical decision-making. Additionally, public perception of AI's decision-making accuracy compared to human drivers plays a vital role in acceptance. Even though AI can process vast amounts of real-time data and make split-second decisions, consumers often evaluate its reliability through a human-centric lens. The challenge lies in making AI-driven decisions more explainable and transparent, as users need reassurance that AI's judgment is not only precise but also aligned with common driving instincts.

4.1. PRACTICAL APPLICATIONS OF THE FINDINGS:

The insights gained from this study have several real-world applications that can enhance consumer confidence in AI-driven transportation.

- First, automotive companies and AI developers must prioritize user education and awareness. Many misconceptions about AI stem from a lack of understanding regarding how these systems operate. Clear communication about AI capabilities, decision-making processes, and safety mechanisms can help bridge the trust gap.

- Second, improving AI's real-time adaptability to road conditions will be essential. AI-driven vehicles must be designed to handle unpredictable scenarios, such as sudden changes in traffic patterns, adverse weather conditions, and interactions with human drivers who may not always follow traffic rules. The ability of AI to respond intelligently to such situations will be a key determinant of trust.
- Third, building regulatory frameworks that ensure ethical AI decision-making is crucial. Governments and policymakers should collaborate with AI developers to establish guidelines for ethical AI behavior in driving scenarios. This includes prioritizing pedestrian safety, setting standards for AI-driven accident prevention, and ensuring AI remains accountable for its decisions.

5. CONTRIBUTION OF THE STUDY

This study contributes to the ongoing discourse on AI ethics, trust, and transportation technology. While much research has focused on the technical advancements of AI in vehicles, this study shifts the focus toward consumer psychology and behavioral responses to AI-driven mobility. By understanding the factors that influence trust, automotive companies and policymakers can work toward creating a user-friendly and ethically sound AI-powered transportation ecosystem. Additionally, this study bridges the gap between AI functionality and human expectations, emphasizing that the success of AI-driven vehicles is not solely dependent on their efficiency but also on how well they align with human drivers' perceptions of safety and fairness. This contribution is valuable for industries that seek to increase public acceptance of autonomous driving technologies.

6. SCOPE FOR FUTURE RESEARCH

Given the dynamic nature of AI development, future research in this domain should focus on several key areas.

- First, a deeper exploration of AI transparency and explainability is needed. Consumers may hesitate to trust AI when they do not understand how it reaches certain decisions. Future studies can examine how explainable AI (XAI) models influence consumer confidence and whether greater transparency leads to higher acceptance rates.
- Second, cross-cultural studies on AI trust in transportation could provide valuable insights. Trust in AI varies across different societies, influenced by factors such as technological familiarity, legal frameworks, and cultural attitudes toward automation. Understanding these variations can help develop AI systems that cater to diverse populations.
- Third, longitudinal studies could assess how consumer trust evolves over time. As AI-powered vehicles become more common, public attitudes and trust levels may change based on real-world experiences. Tracking these shifts over time can help policymakers and automotive companies adapt their strategies accordingly.

Finally, the ethical implications of AI decision-making require further exploration. Future research should investigate how AI can be programmed to make morally responsible decisions in critical situations, such as unavoidable accidents where prioritization is required. This could lead to the development of ethical AI frameworks that align with societal values. The study underscores the importance of balancing AI efficiency, ethical considerations, and consumer trust in autonomous vehicle adoption. While AI-powered vehicles promise enhanced road safety, their success hinges on how well they align with human expectations and values. Automotive companies, policymakers, and AI developers must work together to improve AI transparency, adaptability, and ethical decision-making to foster greater public trust. As AI technology continues to evolve, ongoing research and practical implementations will be essential in ensuring that AI-driven transportation is both safe and socially accepted.

While this study offers valuable insights into consumer trust in AI-driven vehicles, it has certain limitations. The findings may be limited by sample bias and geographic scope, as consumer attitudes can differ across cultures, economies, and regulatory environments. Additionally, reliance on self-reported survey data introduces potential biases, such as social desirability or limited technical understanding of AI. Furthermore, given the rapidly evolving nature of AI technology, consumer trust levels observed in this study may change over time. Future research should explore diverse global perspectives, incorporate real-world behavioral studies, and track trust dynamics longitudinally to gain a more comprehensive understanding.

CONFLICT OF INTERESTS

None.

ACKNOWLEDGMENTS

None.

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