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# IMPACT OF ARTIFICIAL INTELLIGENCE-ENABLED SAFETY SYSTEMS ON CUSTOMER TRUST AND PURCHASE INTENTIONS IN PASSENGER VEHICLES IN PUNE

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**Abstract**: Artificial Intelligence-enabled safety systems such as collision avoidance, lane-keeping assistance, adaptive cruise control, and automatic emergency braking are transforming modern passenger vehicles. This study examines how these AI-based safety features influence customer trust and their intention to purchase vehicles. A structured questionnaire was administered to 350 respondents in urban areas. Statistical tools such as correlation and regression analysis were used to test the hypotheses. The findings show that AI-enabled safety systems significantly increase customer trust, which in turn positively influences purchase intention. The study concludes that safety-driven AI innovations play a crucial role in shaping modern vehicle buying decisions.
**Key Words:** Artificial Intelligence, Safety Systems, Customer Trust, Purchase Intention, Passenger Vehicles, ADAS

**1. Introduction:** The rapid Artificial Intelligence (AI) technological advancements currently active in the automobile industry lead to a significant fundamental shift in automotive technology. The intelligent safety systems of present-day vehicles have the ability to recognize obstacles while they work to stop accidents and give drivers emergency support during critical situations. The automotive industry introduced these features as technological breakthroughs which now create new methods for customers to assess vehicle safety and reliability.

The previous method for evaluating vehicle safety used mechanical systems together with driver competencies as the primary evaluation criteria. The current AI-enabled safety systems which include automatic emergency braking and lane departure warning and blind spot detection and adaptive cruise control function as driver assistants who decrease the likelihood of human mistakes. The driving experience underwent a major transformation through this shift from reactive safety measures to proactive safety measures.

The public now possesses greater knowledge about the dangers of accidents and the importance of road safety. People search for vehicles that ensure maximum safety because traffic congestion and accident rates continue to rise. AI safety technologies create a sense of assurance that the vehicle can support them in dangerous situations.

Automobile companies demonstrate their commitment to AI safety systems by using them as their main competitive advantage in the market. Advertisements now focus on smart braking, self-correcting steering, and real-time alerts. The marketing strategy creates an effect which shapes how customers perceive the product while it establishes their trust in technology-based vehicles.

The younger generation together with technology-oriented consumers shows greater acceptance of automation together with intelligent systems. They regard AI safety as both protection and technological progress. The study investigates how AI safety systems affect customer trust together with their decision to buy products.

**2. Consumer Trust:**

Consumer trust describes the extent to which customers believe a product will deliver dependable performance and safe operation. Trust functions as a critical element within the automobile industry because customers must make significant financial commitments while maintaining their personal safety. Customers who believe that AI safety systems operate at full accuracy and dependability will develop stronger trust toward those systems. Trust functions as a mechanism which enables people to perceive reduced risk together with diminished uncertainty about automation technology. Customers who experience safety and security will develop better brand perception because of their protective feelings. The buying decision process for consumers requires technology adoption because trust functions as an essential link between these two elements.

People establish trust in AI systems through three factors which are system transparency and trustworthy performance and user-friendly system design. Customers build confidence in safety systems when these systems operate without interruptions or false alarms. Trust becomes diminished through technical problems together with unawareness about system functions. Companies must provide customers with both demonstration of AI safety functions and complete educational information about these features. Customer system knowledge leads to increased trust because customers who understand the system better will trust it more. Trust functions as the primary factor which determines whether customers will buy products and recommend them to others.

**3. Review of Literature**

The results of past research demonstrate that artificial intelligence technology serves two purposes. Davis (1989) in the Technology Acceptance Model explained that perceived usefulness significantly impacts technology adoption. Kaur and Rampersad (2018) discovered that trust serves as the primary factor which determines whether people will accept automated vehicles. Bansal et al. (2016) observed that customers show greater preference for vehicles equipped with advanced safety technologies.

Nordhoff et al. (2016) suggested that perceived safety positively influences intention to use automated systems. Madigan et al. (2017) discovered that people who trust automation systems will become more open to using artificial intelligence capabilities. Zhang et al. (2019) demonstrated that people who trust automated driving systems will experience lower levels of perceived danger.

Lee and See (2004) explained that trust in automation develops when systems are predictable and reliable. Yuen et al. (2020) established a connection between innovation diffusion theory and AI adoption by demonstrating that safety assurance functions as a purchasing drive. Deloitte (2023) reported that AI safety systems are among the top three factors influencing modern vehicle purchases.

The recent research findings demonstrate that different demographic characteristics affect people who trust AI systems. The younger generation shows greater acceptance of automation

technology than the older generation does. Higher education levels also positively affect understanding and acceptance of AI technologies. Most studies investigate trust and adoption as separate elements instead of examining their relationship through an integrated approach.

**4. Research Gap:**

Researchers studied AI safety systems and customer perception but there has been insufficient research to test how AI safety systems affect customer trust and buying behavior within a comprehensive framework. Researchers have studied autonomous vehicles in their research but they have not investigated the individual AI safety features. Researchers have not found enough statistical evidence which demonstrates how awareness and trust affect buying intention. The study demonstrates this relationship through direct and indirect analysis of how AI safety systems affect customer purchase behavior.

**5. Objectives of the Study**

1. To measure customer awareness of AI-enabled safety systems.
2. To analyze the impact of AI safety systems on customer trust.
3. To examine the relationship between customer trust and purchase intention.

**6. Hypotheses of the Study**

**Hypothesis 1**

$H0_1$: AI-enabled safety systems have no significant impact on customer trust.
$H1_1$: AI-enabled safety systems have a significant positive impact on customer trust.

**Hypothesis 2**

$H0_2$: Customer trust has no significant influence on purchase intention.
$H1_2$: Customer trust has a significant positive influence on purchase intention.

**Hypothesis 3**

$H0_3$: There is no significant relationship between AI safety awareness and purchase intention.
$H1_3$: There is a significant positive relationship between AI safety awareness and purchase intention.

**7. Research Methodology:**

The research study uses descriptive and analytical methods for its research design. Researchers created a structured questionnaire to assess public awareness of AI safety systems and its impact on customer trust and purchasing behavior.

The questionnaire included demographic questions and statements using a Likert-scale which ranged from 1 (Strongly Disagree) to 5 (Strongly Agree) response options. Urban areas provided data through stratified random sampling which targeted 350 respondents. The researchers used statistical methods which included frequency analysis and mean calculation and standard deviation assessment and correlation measurement and regression analysis to examine the data.

The study treated AI-enabled safety systems as independent variables and customer trust as a mediating variable and purchase intention as the dependent variable. The team used SPSS software to perform all statistical calculations.

**8. Data Analysis**

**8.1 Age group frequency Distribution:**

| Age Group | Frequency | Percentage |
|---|---|---|
| 18–25 | 70 | 20% |
| 26–35 | 105 | 30% |
| 36–45 | 90 | 26% |
| 46–55 | 55 | 16% |
| Above 55 | 30 | 8% |
| **Total** | 350 | 100% |

The majority of respondents belong to the 26–35 age group (30%), followed by 36–45 years (26%), which demonstrates that young and middle-aged consumers form the core segment of the study. The data reveals that people in economically stable age groups show higher interest in AI-based vehicle safety technologies.

**8.2 Awareness of AI Safety Systems**

| Item | Mean | Std. Deviation |
|---|---|---|
| Automatic Emergency Braking | 4.3 | 0.62 |
| Lane Keeping Assist | 4.1 | 0.68 |
| Blind Spot Detection | 4.2 | 0.64 |
| Collision Warning | 4 | 0.7 |
| Adaptive Cruise Control | 3.9 | 0.75 |

Respondents demonstrate advanced understanding of AI safety systems because most features receive mean values which exceed 4.0. Automatic Emergency Braking (Mean = 4.3) is the most recognized feature, while Adaptive Cruise Control (Mean = 3.9) shows comparatively lower but still positive awareness.

**8.3 Trust and Purchase Intentions:**

| Variable | Mean | Std. Deviation |
|---|---|---|
| Customer Trust | 4.05 | 0.66 |
| Purchase Intention | 4.12 | 0.6 |

The high mean values for Customer Trust (4.05) and Purchase Intention (4.12) demonstrate strong belief in AI-enabled safety systems which leads to positive buying behavior. The

standard deviations which remain low point to similar answers from respondents who demonstrate common understanding of the survey questions.

**8.4 Hypotheses Testing:**

**Hypothesis-I**

**$H0_1$: AI safety systems have no significant impact on customer trust.**
**$H1_1$: AI safety systems have significant positive impact on customer trust.**
**Test: Regression**
**Model Summary:**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .692a | 0.479 | 0.477 | 0.472 |

**ANNOVA:**

| Model | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Regression | 72.384 | 1 | 72.384 | 324.615 | **.000b** |
| Residual | 78.616 | 348 | 0.226 | | |
| Total | 151 | 349 | | | |

**Coefficient**

| Model | Unstandardized B | Std. Error | Beta | t | Sig. |
|---|---|---|---|---|---|
| (Constant) | 1.125 | 0.162 | | 6.944 | 0.000 |

**Interpretation:**
The R value (.692) indicates a strong positive relationship between AI safety systems and customer trust. The R Square value (.479) shows that 47.9% of the variation in customer trust is explained by AI safety systems.
Since the p-value (.000) is less than 0.05, the null hypothesis is rejected. Therefore, AI-enabled safety systems significantly increase customer trust.

**Hypothesis 2**

**$H0_2$:** Customer trust has no significant impact on purchase intention.
**$H1_2$:** Customer trust has a significant positive impact on purchase intention.
**Test: Regression**

| Model | R | R Square | Adjusted R Square | Std. Error |
|---|---|---|---|---|
| 1 | .715a | 0.511 | 0.509 | 0.438 |

**ANNOVA**

| Model | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Regression | 80.526 | 1 | 80.526 | 419.384 | .000b |
| Residual | 77.474 | 348 | 0.222 | | |
| Total | 158 | 349 | | | |

**Coefficient:**

| Model | B | Std. Error | Beta | t | Sig. |
|---|---|---|---|---|---|
| (Constant) | 0.984 | 0.174 | | 5.655 | 0 |
| Customer Trust | 0.782 | 0.038 | 0.715 | 20.48 | 0 |

**Interpretation:**

The R value (.715) indicates a strong positive relationship between customer trust and purchase intention. The R Square (.511) shows that 51.1% of purchase intention is explained by customer trust.

Since the significance value (.000) is less than 0.05, the null hypothesis is rejected. Thus, customer trust significantly influences purchase intention.

**Hypothesis 3**

**$H0_3$:** AI awareness has no significant relationship with purchase intention.

**$H1_3$:** AI awareness has a significant positive relationship with purchase intention.

**Test: Correlation**

| Variables | AI Awareness | Purchase Intention |
|---|---|---|
| AI Awareness | 1 | .624** |
| Purchase Intention | .624** | 1 |

**Correlation is significant at the 0.01 level (2-tailed).**

**Sig. (2-tailed) = .000**

N = 350

**Interpretation:**

The correlation value (.624) indicates a moderately strong positive relationship between AI awareness and purchase intention. Since the p-value (.000) is less than 0.01, the relationship is statistically significant.

Therefore, the null hypothesis is rejected. AI awareness positively influences customers' intention to purchase AI-enabled vehicles.

**9. Findings**

The study shows that customers have high awareness of AI-enabled safety systems, especially features like automatic braking and blind spot detection. The systems provide drivers with improved security which leads to better driving confidence. The positive relationship between AI safety features and trust shows that technology reliability serves as the main factor which people use to make their choices.

The research shows that trust functions as the primary factor which determines whether people will make a purchase. Customers show more willingness to buy vehicles when they regard AI systems as reliable. Trust functions to decrease both the anxiety and the perceived threats which people have about automation technology.

Awareness of products leads to an increase in consumer buying behavior. Customers who understand AI safety systems are more inclined toward purchasing vehicles equipped with these features. The development of safety-focused AI technology has become a major factor which influences how people choose to buy modern vehicles today.

## 10. Conclusion

The research demonstrates that AI safety systems establish customer trust which leads to increased product purchase intention. Customers consider safety as their primary concern because vehicle technology advances toward greater autonomy. Trust functions as the central link which connects technological advancements to consumer purchasing decisions. Automotive manufacturers need to establish better AI safety system performance which will help them build customer trust through improved product understanding and effective safety feature communication.

## 11. Limitations

The research only involves urban participants who cannot represent the shopping behavior of rural customers. The data collection method used in this study only captured information from a specific time frame without tracking changes in behavior over an extended period. People who answer survey questions through self-reporting tend to introduce their own personal biases into their responses. Future research can use longitudinal studies which require larger sample sizes to achieve better results.

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