

Understanding Indonesian Toll Road Users' Demand and Attitudes Toward Mandatory Toll Insurance

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Abstract: *As Indonesia's toll road network expands, associated risks like accidents and financial liabilities have risen, revealing a need for comprehensive toll insurance. This study evaluates Indonesian toll road users' perceptions and willingness to adopt mandatory toll insurance, with a focus on key factors such as safety and financial risk perceptions, attitudes toward insurance, trust in institutions, travel behavior, and price sensitivity. Findings from multiple linear regression analysis indicate that perceptions of safety and financial risks significantly drive the perceived need for toll insurance, aligning with Prospect Theory's emphasis on loss aversion (Kahneman & Tversky, 1979). Notably, while trust in institutions positively influences adoption intent, a favorable general attitude toward insurance correlates with a lower perceived need for toll-specific coverage, possibly due to existing insurance products. Contrary to expectations, price sensitivity emerged as the strongest predictor, suggesting that price-conscious users may value toll insurance as a cost-effective risk management tool. These results underscore the role of targeted communication and affordable pricing models in promoting toll insurance adoption in Indonesia.*

Keywords: Toll Insurance, Risk Perception, Willingness to Pay, Travel Behavior, Price Sensitivity

1. Introduction

Indonesia has experienced rapid expansion, growing from around 780 km in 2014 to over 2,600 km by 2023, with a target of 3,000 km by 2024 as part of the National Strategic Projects (Susanto, 2024). This development has greatly enhanced regional connectivity and economic mobility, especially in densely populated areas like Java. However, with the increased toll road usage comes a rise in associated risks, including road accidents, which result in substantial financial losses and personal injuries. From 2020 to 2022, approximately 12,382 incidents occurred on toll roads, leading to billions in damages (Badan Pengatur Jalan Tol, 2022). Over half of those injured fell into poverty due to the financial strain caused by these accidents (Rahadiansyah, 2023). This highlights the need for enhanced safety measures, including financial protection for toll road users.

Currently, PT Jasa Raharja offers limited accident coverage for all vehicle users in Indonesia, excluding single-vehicle incidents and infrastructure damage, leaving many toll road users in a vulnerable financial situation (PT Jasa Raharja, n.d.). With only 31% of vehicles in Indonesia insured as of January 2023 (Populix, 2023), there is a clear issue of underinsurance, reflecting

a lack of consumer awareness and uptake of available insurance products. In response to these challenges, PT Jasarahrja Putera has proposed mandatory toll insurance to cover personal accidents, vehicle damage, and third-party liability for toll road users and the infrastructure itself. The planned payment system will function as follows: the toll insurance premium will be incorporated into the toll fee, collected at the toll entrance gate, and paid using an E-toll card. It will be included as a single payment rather than two distinct charges.

Despite the potential benefits of mandatory toll insurance, there is no precedent for such a regulation, either in developed or developing countries. In developed nations, well-established insurance systems and public familiarity with insurance processes reduce the need for such products. In contrast, in developing countries like Indonesia, short-term orientations, which prioritize immediate obligations over long-term planning (Abdelrahim, 2021), and low awareness of insurance benefits contribute to the underutilization of insurance. Moreover, in many developing countries, insurance, particularly Motor Third-Party Liability Insurance (MTPL), is often perceived as a mandatory tax rather than a protective measure (Gonulal, 2009).

The research seeks to evaluate the feasibility of introducing such a product and provide insights into the factors shaping demand among toll road users by examining toll road users' perceptions of financial and safety risks, their attitudes toward insurance, their travel behavior, their trust level and perceived institutional quality, and the role of price sensitivity in influencing their willingness to adopt mandatory toll insurance.

2. Literature Review

2.1. Previous Studies on Toll Insurance and Research Gaps

There is a clear research gap regarding toll insurance in Indonesia, as most existing studies focus on general motor and third-party liability insurance. This leaves the specific area of toll insurance, which covers personal accidents, vehicle damage, and third-party liabilities, relatively unexplored. Indonesia's rapidly expanding toll road network presents growing financial risks for drivers, but insurance adoption remains low. Limited research has been conducted on users' perceptions, attitudes, and price sensitivity concerning insurance products, particularly toll insurance. This study aims to address these gaps by investigating the behavior and attitudes of toll road users in Indonesia, who may have distinct needs and risk perceptions compared to general vehicle owners.

2.2. Key Studies on Insurance and Willingness to Pay

A key study on road users' willingness to pay (WTP) for toll road usage by Widyastuti, Baharini, and Prastyanto (2024) revealed a positive correlation between income and WTP for toll services. However, frequent toll users were found to have lower WTP for additional services, likely because they become accustomed to using the roads without facing significant risks. This insight highlights the challenge of price sensitivity and suggests that frequent users may undervalue the need for toll insurance despite their higher exposure to accidents. Another study by the World Bank on Motor Third-Party Liability Insurance (MTPL) in developing countries reveals that insurance is often misunderstood as a tax rather than a protection tool (Gonulal, 2009). This is particularly relevant in Indonesia, where low insurance penetration and public awareness hinder adoption. Additionally, the rigid government-prescribed premium system can limit market efficiency and hinder the rollout of new products like toll insurance. This study underscores the importance of user awareness and regulatory frameworks in shaping the success of toll insurance.

2.3. Theoretical Frameworks

This research draws on Prospect Theory and Protection Motivation Theory (PMT) to explain toll road users' decision-making processes concerning toll insurance. Prospect Theory, by Kahneman and Tversky (1979), emphasizes that individuals fear losses more than they value equivalent gains. In this context, users who perceive a high financial risk from toll road accidents may be inclined to purchase toll insurance. However, Prospect Theory also suggests that users may underweight the probability of rare events, like accidents, leading them to avoid insurance unless they perceive a significant risk. Protection Motivation Theory (PMT), by Rogers (1975) complements this by outlining how perceived severity, vulnerability, and response efficacy influence the adoption of protective behaviors, such as purchasing toll insurance. Users who perceive high financial and safety risks are more likely to adopt toll insurance if they believe it offers effective protection. Both theories help explain how perceptions of financial and safety risks, along with price sensitivity, shape users' attitudes toward toll insurance.

2.4. Research Variables

These are the key variables that will be analyzed to understand how users perceive risks, their attitudes toward insurance, and their willingness to pay for toll insurance.

2.4.1. Perceived Need for Toll Insurance

The perceived need for toll insurance reflects users' recognition of the importance of being financially protected in case of accidents. Protection Motivation Theory (Rogers, 1975) highlights that perceived need is influenced by the user's sense of vulnerability to risks and the severity of potential consequences.

2.4.2. Perception of Safety Risk

A user's perception of safety risk refers to how they evaluate the likelihood and severity of accidents on toll roads. According to Rundmo and Iversen (2004), individuals who perceive higher safety risks are more likely to engage in protective behaviors, such as purchasing insurance. In the context of toll roads, if users perceive that the roads are unsafe or that accidents are common, they may feel a greater need for insurance. In Indonesia, where traffic conditions vary widely, it is crucial to understand how users' safety risk perceptions influence their interest in toll insurance.

2.4.3. Perception of Financial Risks

The perception of financial risks relates to how much toll road users fear the financial consequences of accidents. According to Prospect Theory (Kahneman & Tversky, 1979), individuals are generally loss-averse, meaning they are motivated to avoid potential financial losses, such as vehicle damage or injury costs, rather than pursue gains. In the context of toll road users, if they perceive accidents as financially devastating, they may be more inclined to adopt toll insurance.

2.4.4. Attitude Toward Insurance

Users' attitude toward insurance reflects their beliefs about its value, necessity, and effectiveness. Protection Motivation Theory (Rogers, 1975) suggests that individuals who believe in the effectiveness of insurance in mitigating financial risk are more likely to adopt it. This variable is important because users' pre-existing attitudes toward insurance could either drive or hinder the adoption of a new toll insurance product.

2.4.5. Level of Trust and Institutional Quality

Trust in insurance companies and the perceived quality of government institutions responsible for regulating insurance significantly affect the adoption of insurance products. Guiso et al. (2004) found that low trust in financial institutions correlates with lower adoption of insurance products, particularly in developing countries. This variable is critical to understanding whether users trust that toll insurance will provide effective protection or whether distrust in the system will hinder its adoption.

2.4.6. Travel Behavior

Travel behavior refers to how frequently users drive on toll roads and is a critical factor in understanding the perceived need for toll insurance. Users who frequently travel on toll roads are more exposed to the risk of accidents, potentially increasing their likelihood of perceiving a need for insurance. However, research by Erhardt et al. (2018) indicates that frequent users may underestimate risks due to habituation, becoming desensitized to the potential dangers they face. In this context, the travel behavior of toll road users in Indonesia will help identify whether frequent users are more or less likely to adopt toll insurance based on their risk perception and exposure to toll road conditions.

2.4.7. Price Sensitivity

Price sensitivity measures how sensitive users are to the cost of toll insurance. In developing countries, consumers are often highly price-sensitive due to lower disposable incomes, and this can significantly affect insurance adoption. Toll road users may be reluctant to purchase insurance if the premiums are perceived as too high relative to the perceived risk of accidents.

2.5. Hypotheses Development

Based on the previous studies and the theories used, the hypotheses constructed for this research are:

- **H1:** Perception of Safety Risks is positively related to the Perceived Need for Toll Insurance.
- **H2:** Perception of Financial Risks is positively related to the Perceived Need for Toll Insurance.
- **H3:** Attitude Towards Insurance is negatively related to the Perceived Need for Toll Insurance.
- **H4:** Level of Trust and Institutional Quality is positively related to the Perceived Need for Toll Insurance.
- **H5:** Travel Behavior is positively related to the Perceived Need for Toll Insurance.
- **H6:** Price Sensitivity is negatively related to the Perceived Need for Toll Insurance.

3. Methodology

3.1. Research Methodology

This study employs a quantitative research design utilizing a structured survey method to collect primary data from toll road users in Indonesia. The quantitative approach is effective for measuring perceptions, attitudes, and behaviors in a statistically significant manner. The survey incorporates Likert-scale and profiling questions, facilitating the examination of key variables influencing consumer perception regarding toll insurance.

3.2. Data Collection

Primary data is collected via an online survey administered through Google Forms. The survey link is distributed through social media and messaging applications to reach the target population.

The questionnaire comprises 26 questions, categorized into two main types:

- **Profiling Questions:** These gather background information, including demographic details (location and proximity to toll entrances), driving patterns (frequency of toll use), and prior insurance experiences. This information is crucial for segmenting respondents and understanding variations in perceptions of toll insurance.
- **Likert-Scale Questions:** These assess attitudes toward key variables such as perceived safety risks, trust in insurance providers, price sensitivity, and willingness to adopt toll insurance. Utilizing a 5-point Likert scale ensures nuanced data collection, allowing for quantitative analysis.

By integrating these two question types, the survey profiles respondents while capturing detailed insights into their attitudes and behaviors related to toll insurance, enabling comprehensive analysis.

3.2.1. Population and Sample

The target population comprises toll road users in Java, with the exception of Banten and Special Region of Yogyakarta, where the majority of Indonesia's toll roads are located. The sample for this research is taken using purposive sampling with following criteria:

- Drive their own vehicles regularly
- Use toll roads at least once every three months
- Are potential purchasers of toll insurance

A non-probability purposive sampling method is employed to ensure that respondents meet these criteria, targeting those most likely to consider the proposed toll insurance product. The target sample size is between 300 and 600 respondents, deemed adequate for meaningful statistical analysis given the exploratory nature of the study (Malhotra et al., 2017, 418).

3.3. Data Analysis

Multiple linear regression aims to clarify the relationship between the dependent variable—willingness to adopt mandatory toll insurance—and various independent variables. This approach evaluates how well these variables forecast the dependent variable, offering insights into factors affecting toll road users' interactions with toll insurance products.

The analysis will involve several key steps. Data will first be gathered via questionnaires designed to capture key variables outlined in the conceptual framework. After entering the data into SPSS, initial analyses will confirm compliance with multiple linear regression assumptions. A regression model will be applied to determine coefficients indicating the strength and direction of relationships between independent and dependent variables.

This methodology is particularly relevant as it provides a quantitative framework for understanding consumer behavior regarding toll insurance adoption. By identifying key factors influencing the perceived need for toll insurance, this analysis offers insights into the likelihood of making toll insurance mandatory based on market perceptions and attitudes. The findings

are expected to inform targeted strategies for enhancing consumer engagement with toll insurance products, supporting the overarching goal of this research.

4. Findings and Discussion

4.1. Respondents Demographic Profile

A total of 564 responses were collected, reflecting a diverse demographic profile relevant to this study. The majority of respondents (64.5%) reside in West Java, followed by DKI Jakarta (17.4%), East Java (15.6%), and Central Java (2.5%). This distribution aligns with the intended focus on toll road users in Java, a region where toll road infrastructure is highly concentrated and used frequently.

In terms of proximity to toll entrance gates, 43.6% of respondents live within 5 kilometers of the nearest toll entrance. Another 36.5% live between 5 to 10 kilometers from a toll gate, and 19.9% are located more than 10 kilometers away. This proximity data provides insight into travel behavior and potential exposure to toll road usage, a key factor in understanding the target population for toll insurance.

Regarding insurance ownership, 78.2% of respondents indicated they currently have at least one insurance product, while 21.8% do not have any insurance coverage. Among those who hold insurance, 44.8% voluntarily purchased it, 34.3% were influenced by family, and 18.6% obtained insurance through their employers.

Examining the types of insurance held, 80% of respondents have health insurance, 48% have life insurance, and 26% hold vehicle insurance. The dominance of health insurance suggests a prioritization of personal well-being among respondents, while the lower adoption rates for life and vehicle insurance indicate varying levels of perceived necessity across insurance types. This profile information not only offers a foundation for understanding respondents' insurance behaviors but also aids in segmenting the potential audience for toll insurance products.

4.2. Multiple Linear Regression Results

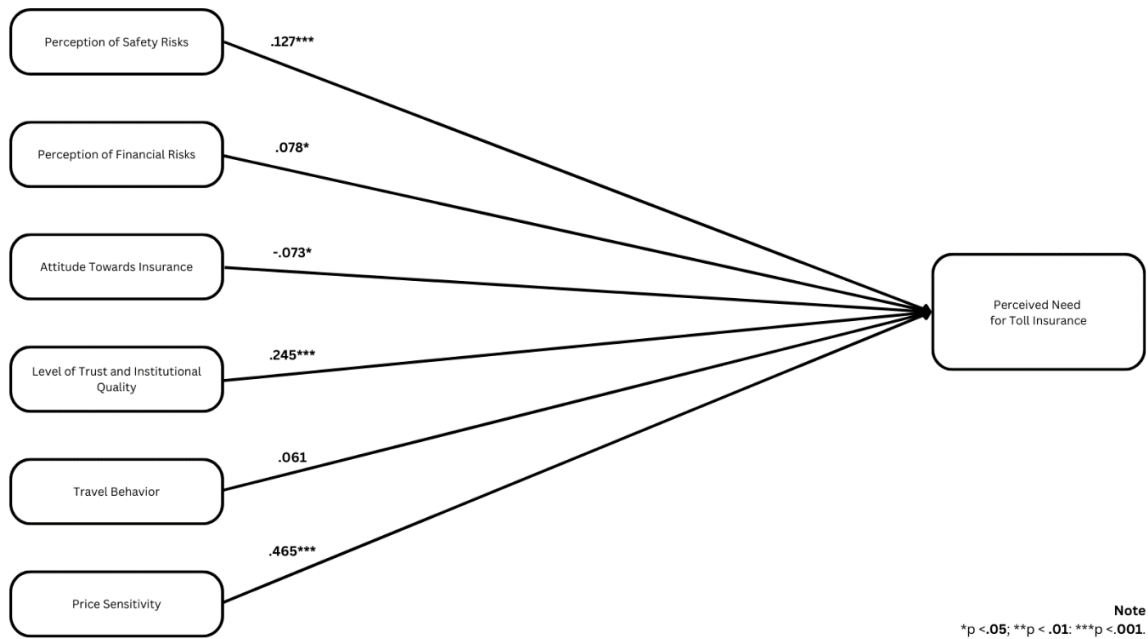


Figure 1: Conceptual Framework and Results of Multiple Linear Regression

The Figure 1 shows how the relationships between various independent variables (perception of safety risks, perception of financial risks, attitude towards insurance, level of trust and institutional quality, travel behavior, and price sensitivity) and the dependent variable, which is the perceived need for toll insurance examined by the multiple linear regression analysis. The standardized Beta coefficients, which allow for the comparison of the relative influence of each independent variable on the dependent variable, are presented in Table 1.

Table 1: Results of Multiple Linear Regression

		Coefficients ^a		Standardized Coefficients Beta	t	Sig.
Model		Unstandardized Coefficients B	Std. Error			
1	(Constant)	.005	.239		.022	.982
	Perception of Safety Risks	.189	.054	.127	3.519	<.001
	Perception of Financial Risks	.114	.052	.078	2.184	.029
	Attitude Towards Insurance	-.111	.056	-.073	-2.000	.046
	Level of Trust and Institutional Quality	.293	.045	.245	6.591	<.001
	Travel Behavior	.091	.047	.061	1.934	.054
	Price Sensitivity	.575	.043	.465	13.335	<.001

a. Dependent Variable: Perceived Need for Toll Insurance

The size of the p-value reflects how strongly the null hypothesis's validity. Guidelines typically indicate that $p < 0.001$ represents very strong evidence, $p < 0.01$ indicates strong evidence, $p < 0.05$ reflects moderate evidence, $p < 0.1$ suggests weak evidence or a trend, and $p \geq 0.1$ signifies inadequate proof (Cave, 2023).

1) Perception of Safety Risks

- Beta = 0.127, t = 3.519, p < 0.001

This result indicates a significant positive relationship between the perception of safety risks and the perceived need for toll insurance. For every one standard deviation increase in the perception of safety risks, the perceived need for toll insurance increases by 0.127 standard deviations. This supports the hypothesis that individuals who perceive higher safety risks on toll roads are more likely to see the need for toll insurance (**H1 very strongly supported**).

2) Perception of Financial Risks

- Beta = 0.078, t = 2.184, p = 0.029

The perception of financial risks also has a significant positive impact on the perceived need for toll insurance. The Beta value of 0.078 suggests that as the perceived financial risks associated with accidents or toll-related incidents increase, so does the perceived need for toll insurance, although the effect is relatively modest. Therefore, the hypothesis that higher perceived financial risks are associated with a greater perceived need for toll insurance is supported (**H2 moderately supported**).

3) Attitude Towards Insurance

- Beta = -0.073, t = -2.000, p = 0.046

Interestingly, there is a significant negative relationship between attitude towards insurance and the perceived need for toll insurance. The Beta coefficient of -0.073 implies that a more favorable attitude towards insurance in general is associated with a lower perceived need for toll insurance. This result may suggest that people who already have a positive attitude towards existing insurance products might not feel an additional need for toll insurance, which aligns with the hypothesis (**H3 moderately supported**).

4) Level of Trust and Institutional Quality

- Beta = 0.245, t = 6.591, p < 0.001

The level of trust and institutional quality has a strong and significant positive relationship with the perceived need for toll insurance, with a Beta value of 0.245. This suggests that higher trust in institutions (such as insurance providers and government agencies) significantly increases the perceived need for toll insurance. The hypothesis that higher levels of trust and institutional quality will lead to a greater perceived need for toll insurance is supported (**H4 very strongly supported**).

5) Travel Behavior

- Beta = 0.061, t = 1.934, p = 0.054

The relationship between travel behavior (frequency of toll road use) and the perceived need for toll insurance is marginally significant, with a Beta coefficient of 0.061. Although the p-value is slightly above the conventional 0.05 threshold, the positive direction of the Beta suggests that more frequent toll road users may perceive a greater need for toll insurance. This result partially supports the hypothesis that frequent toll users would have a higher perceived need for toll insurance (**H5 partially supported**).

6) Price Sensitivity

- Beta = 0.465, t = 13.335, p < 0.001

Price sensitivity is the strongest predictor of the perceived need for toll insurance, with

a Beta value of 0.465. This indicates that respondents who are more sensitive to the price of toll insurance are significantly more likely to perceive a need for it. The large Beta coefficient suggests that price considerations play a major role in determining consumers' perceived need for toll insurance, contrary to the initial hypothesis (**H6 not supported**).

The regression results suggest that all variables, except for attitude towards insurance, have either significant or marginally significant positive relationships with the perceived need for toll insurance. The strongest predictors are price sensitivity and the level of trust and institutional quality, highlighting the importance of affordability and institutional confidence in shaping consumer attitudes toward toll insurance. In contrast, the negative effect of general attitude towards insurance suggests a more complex relationship, possibly indicating that those already satisfied with other forms of insurance may not see additional toll insurance as necessary.

4.3. Discussion

The results of this study reveal several important insights into the factors that shape the perceived need for toll insurance among toll road users in Indonesia. The multiple linear regression analysis confirmed the significance of several variables, shedding light on their relative influence.

Firstly, both perception of safety risks and perception of financial risks positively contribute to the perceived need for toll insurance. This finding aligns with **Prospect Theory**, which posits that individuals are more sensitive to potential losses than equivalent gains. Users who feel vulnerable to accidents or financial loss on toll roads are likely to view toll insurance as a necessary form of protection (Kahneman & Tversky, 1979, 279). This aligns with the assumption that heightened awareness of risks leads to an increased valuation of insurance products, as individuals are motivated to mitigate perceived losses.

On the other hand, the attitude towards insurance exhibited a negative relationship with the perceived need for toll insurance, indicating that users with a positive outlook on insurance may not feel the need for additional coverage. This could stem from the assumption that existing insurance policies provide sufficient protection. This deviation from expectations suggests a gap in consumer understanding that could be addressed through targeted educational campaigns.

A key finding is the strong influence of trust and institutional quality on the perceived need for toll insurance. Higher levels of trust in institutions, such as insurance providers and government agencies, significantly enhance users' willingness to adopt toll insurance. This observation reflects Protection Motivation Theory, which emphasizes that trust in the efficacy and reliability of protective measures is crucial for motivating individuals to take protective actions (Rogers, 1975, 100). Thus, enhancing transparency and credibility among stakeholders will be critical in promoting the acceptance of mandatory toll insurance.

Moreover, travel behavior, or toll road usage frequency, while positively correlated, showed a marginally significant relationship with the perceived need for toll insurance. This finding partially aligns with the expectation that frequent users would recognize a higher level of risk exposure; however, the weak effect size suggests that toll usage frequency alone may not be a major driver for insurance adoption. Moreover, this might disregard the previous study that frequent toll users have lower WTP for additional services (Widyastuti et al., 2024, 544) as the

findings prove that the relationship between travel behavior and perceived need for toll insurance is not significant enough.

Lastly, price sensitivity emerged as the strongest predictor of the perceived need for toll insurance. Contrary to initial assumptions that higher price sensitivity might deter adoption, the results indicate that price-conscious consumers may paradoxically see greater value in toll insurance as a cost-effective means of mitigating financial risks. This insight aligns with Prospect Theory, which posits that individuals weigh potential losses against the cost of insurance, leading them to favor products that promise protection against financial downturns at a manageable price point. The preference for a mandatory insurance product suggests a strategic opportunity for insurers to offer competitive pricing structures that resonate with price-sensitive consumers.

4.4. Conclusion

This study explored the feasibility of introducing mandatory toll insurance for toll road users in Indonesia, focusing on key factors such as safety and financial risk perceptions, price sensitivity, insurance attitudes, trust in institutions, and travel behavior. The findings provide valuable insights into the attitudes and perceptions of toll road users and reveal the complexities involved in promoting a new insurance product within this market.

The regression analysis confirmed that users who perceive higher safety and financial risks on toll roads are more inclined to see toll insurance as necessary. Trust in institutions also plays a critical role in shaping this perception, suggesting that the success of mandatory toll insurance would depend heavily on the credibility and transparency of both insurance providers and government regulators. Price sensitivity, the strongest predictor of the perceived need for toll insurance, highlights the importance of affordability and the perception that toll insurance offers good value for money.

However, the unexpected negative relationship between general insurance attitudes and the perceived need for toll insurance suggests that existing insurance coverage may lead some users to view additional toll insurance as redundant. This points to the need for clear differentiation between toll insurance and other types of insurance products, emphasizing its specific benefits for toll road users.

The findings suggest several actionable strategies for promoting mandatory toll insurance. First, efforts to increase adoption should focus on educating the public about the specific risks associated with toll road usage, particularly the financial and safety risks that toll insurance can mitigate. Additionally, campaigns should address the trust deficit by promoting the credibility of both insurers and regulatory bodies.

Given the strong influence of price sensitivity, insurers should consider offering affordable premium rates to appeal to price-conscious users. Furthermore, the findings on insurance fatigue suggest the need for clear communication about the distinct benefits of toll insurance, distinguishing it from other insurance products that consumers may already hold.

While this study provides valuable insights into toll insurance adoption, it is important to acknowledge its limitations. The research relies on self-reported data, which may be subject to biases such as overreporting or underreporting certain behaviors or perceptions. Additionally, the focus on toll road users in Java may limit the generalizability of the findings to other regions in Indonesia with different levels of toll road infrastructure and insurance adoption.

Future research could expand the geographic scope of the study and explore other factors that may influence toll insurance adoption, such as cultural attitudes toward risk and protection or the role of social networks in shaping insurance decisions. Moreover, qualitative studies could provide deeper insights into the underlying motivations and concerns of potential toll insurance adopters.

To conclude, while the study indicates that there is a viable market for mandatory toll insurance, its successful implementation will require addressing potential concerns around pricing, existing coverage overlap, and institutional trust. Tailored communication strategies, transparency in pricing, and efforts to build trust in insurance institutions will be essential to fostering consumer acceptance and ensuring the adoption of this new product. Further research could focus on how pricing models and insurance coverage levels influence long-term consumer behavior and on potential regulatory frameworks that would support the rollout of mandatory toll insurance in Indonesia.

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