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Factors that influence the electric scooter experience in the urban transportation in Arequipa, Peru

In collaboration with:

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By:

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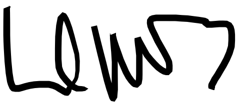

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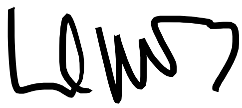

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CERTIFICATE OF NON-PLAGIARISM

I, the undersigned, Marco Rodrigo Huanqui Cornejo, a student at FGES, during the academic year " 2024/2025 ", hereby certify that this Master's research document “Factors that influence the electric scooters users experience in the urban transportation in Arequipa, Peru”, is strictly the result of my work, of synthesis and analysis.

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research document, a grade equal to 0, and a summons to appear before the school's disciplinary board.

Lille, 14/05/2025

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SUMMARY (ENGLISH)

This study explores the factors that influence the user experience of electric scooter (e-scooter) owners in urban transportation within the city of Arequipa, Peru. As micro mobility becomes increasingly relevant in Latin American cities, it is crucial to understand how e-scooter users perceive their commuting experience in terms of safety, comfort, infrastructure, cost, environmental impact, and social perception. The research focuses exclusively on individuals who already own an e-scooter, thus providing insights into the long-term and personalized use of this transport mode, beyond shared systems.

The methodology employed is quantitative, based on a structured survey administered to e-scooter owners in Arequipa. The survey was designed to analyze the influence of independent variables such as road infrastructure, vehicle performance, user habits,

safety perceptions, environmental attitudes, cost-effectiveness, and social acceptance, on the dependent variable: overall user experience.
The results reveal that infrastructure quality, cost-effectiveness, and social perception are the most significant factors shaping the user experience. Safety concerns also remain a moderate issue, while environmental awareness plays a less dominant role among current users.
This research contributes to the limited academic literature on private e-scooter ownership in the Global South and offers practical recommendations for urban planners and policymakers in Arequipa to enhance micro mobility conditions.

RÉSUMÉ (FRENCH)

Cette étude examine les facteurs qui influencent l'expérience des utilisateurs de trottinettes électriques dans les transports urbains à Arequipa, au Pérou. Contrairement à d'autres recherches centrées sur les systèmes de trottinettes partagées, cette recherche se concentre exclusivement sur les personnes possédant déjà une trottinette électrique, afin de mieux comprendre leur expérience quotidienne à long terme.
Une méthode quantitative a été utilisée, à travers une enquête structurée adressée aux propriétaires de trottinettes électriques dans la ville. L'objectif était d'évaluer l'influence de plusieurs variables indépendantes telles que l'infrastructure urbaine, la performance du véhicule, les habitudes d'utilisation, la perception de la sécurité, l'impact environnemental, la rentabilité et l'acceptation sociale, sur l'expérience globale de l'utilisateur.
Les résultats montrent que la qualité de l'infrastructure, la rentabilité et la perception sociale sont les éléments les plus déterminants dans l'expérience des utilisateurs. La sécurité reste une préoccupation modérée, tandis que l’aspect environnemental, bien qu’important, est moins influent parmi les usagers actuels.
Cette recherche enrichit la littérature académique sur la mobilité électrique privée dans le contexte des pays du Sud et offre des recommandations pratiques pour les décideurs publics et les urbanistes d’Arequipa.

KEYWORDS

- Electric scooters
- Urban transportation
- User experience
- Arequipa
- Micro Mobility

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Special thanks go to the electric scooter users in Arequipa, Peru, who took the time to participate in the survey, making the data collection possible and meaningful.

Lastly, I am deeply grateful to my family and friends for their constant support, patience, and encouragement throughout this academic journey. But above all I want to thank my father Carlos Efrain Huanqui Guerra, who supported me from the beginning and it was his wish to see his son become a great professional. Today he is in heaven watching over me, thank you dad, I love you.

1. INTRODUCTION

In recent years, electric scooters (e-scooters) have emerged as a popular alternative for urban transportation in many cities around the world. Their lightweight design, zero-emissions operation, and suitability for short-distance travel have made them a favored choice among city dwellers seeking flexibility and autonomy. In the Latin American context, cities like Arequipa, Peru, are beginning to experience a shift toward this mode of micro mobility, although research in this region remains limited.

This study focuses specifically on individuals who already own an e-scooter, as opposed to users of shared systems. This distinction is important because private users often develop a deeper and more sustained relationship with their vehicles, which may influence their perception of transportation experience.

The theoretical framework for this research draws upon urban mobility theories, technology acceptance models, and user experience literature. The central research problem revolves around identifying which factors most significantly affect the perceived user experience of e-scooter owners in Arequipa.

To address this, a quantitative research approach was adopted. Data was collected through a structured survey targeting local e-scooter owners. The research investigates how independent variables such as road infrastructure, cost-effectiveness, safety, performance, environmental awareness, and social perception affect the dependent variable: the overall user experience.

The main objective of this study is to evaluate and prioritize the factors that shape the daily commuting experience of e-scooter users, in order to inform local urban mobility strategies.

This thesis is structured into several sections: literature review, theoretical framework, methodology, results and analysis, discussion, conclusions, and recommendations for future research.

2. LITERATURE REVIEW

2.1 Introduction Literature Review

The growing popularity of electric scooters (e-scooters) as a private mode of urban transportation has transformed how individuals navigate modern cities. While many studies have focused on shared e-scooters, private ownership presents distinct patterns of use, motivations, and user experiences. This literature review explores the key factors that shape the experience of e-scooter owners in cities, focusing on evidence that can inform analysis in the context of Arequipa, Peru, a city where traffic congestion, air pollution, and public transportation limitations continue to push residents toward alternative mobility options.

By reviewing existing literature, this section identifies the key dependent and independent variables affecting user experience for private e-scooter owners, considering infrastructural, behavioral, motivational, and policy-related influences. The goal is to provide a solid theoretical framework for analyzing how these factors shape the perceptions and usage patterns of actual owners in the city.

Recent research has increasingly examined the factors influencing both private and shared e-scooter adoption. For example, the ATRF (2024) study on private e-scooter ownership in New Zealand highlights differences in motivations and safety perceptions compared to shared users. From a usability perspective, Kormos and Zhang (2023) analyze the user experience of e-scooter riding through a human–computer interaction lens, emphasizing comfort and satisfaction as key outcomes. Broader systematic reviews, such as Shaheen and Cohen (2022), provide global evidence on environmental, social, and policy impacts of e-scooters, while Reck and Axhausen (2024) empirically identify socio-demographic and infrastructural determinants of usage in European cities. In the Latin American context, the Lima Como Vamos (2023) baseline study offers important insights into micro mobility markets in Peru, underlining the economic and practical drivers of private scooter ownership. Other works extend the discussion by linking scooter use with health and safety impacts (Bai & Jiao, 2020; Ylä-Jääski & Lähde, 2022) and by analyzing purchase factors and technical performance expectations (Chen & Hsu, 2024). Taken together, these studies strengthen the rationale for examining infrastructure, technical performance, safety, motivation, and economic cost-benefit perception as critical variables shaping the user experience of electric scooter owners in Arequipa.

2.2 User Experience of Private E-Scooter Owners

The user experience of electric scooter (e-scooter) owners refers to the subjective perception of how convenient, enjoyable, and effective the scooter is in meeting their daily urban mobility needs. In the context of Arequipa, where urban mobility challenges are distinct due to limited public transport integration and infrastructure limitations, this variable becomes critical in understanding the long-term viability of e-scooters as a personal transport solution.

[1]*2.2.1. Defining User Experience in E-Scooter Use*

The concept of user experience (UX) in the context of electric scooter usage refers to more than just operational performance or economic factors. According to the ISO 9241-210 (2010) standard, “user experience encompasses a person's perceptions and responses resulting from the use or anticipated use of a product, system, or service.” This definition highlights the subjective and holistic nature of UX, including emotional responses, usability, satisfaction, and how well the product integrates into a user's routine and expectations.

In the case of electric scooters, UX involves elements such as perceived safety, convenience, comfort, cost-efficiency, and infrastructure suitability. These dimensions determine how users interact with their scooters on a daily basis and how this mode of transport fits within the broader urban mobility ecosystem.

2.2.2. Measuring User Satisfaction

Several studies emphasize satisfaction as the core indicator of user experience. For instance, Kumar, Shukla, and Marwah (2024) found that in Raipur, India, satisfaction with personal e-scooters was linked to smooth riding performance, maintenance ease, and cost-effectiveness. Similarly, Gisbert (2019) noted that ergonomic design and battery autonomy were significant predictors of satisfaction among individual users.

Huang (2024) further highlights the importance of sustained usage as a proxy for satisfaction. In this context, users who continue to use their scooters frequently report higher levels of satisfaction across dimensions like convenience, economic benefit, and time savings.

[1] The international standard on ergonomics of human-system interaction, ISO 9241-210, defines UX as "a person's perceptions and responses that result from the use or anticipated use of a product, system or service". https://www.iso.org/standard/77520.html

2.2.3. Emotional and Behavioral Aspects

User experience also involves emotional engagement and perceived enjoyment. According to Mehzabin (2024), users of shared micro mobility services—including e-scooters—develop emotional ties to the experience of riding, which can influence continued usage. Although her study focuses on shared mobility, these emotional connections also apply to privately owned e-scooters, especially when integrated into daily routines and preferred routes.

In addition, perceived freedom, independence, and fun factors—elements often underexplored in transportation research play a role in shaping the user experience. This aligns with the view of UX as a multidimensional concept, rather than a single measurable factor.

2.2.4. Infrastructure and Urban Integration

Finally, the user experience is affected by how well e-scooters integrate into the existing urban transport landscape. As noted by Dias (2024), urban infrastructure—such as bike lanes, parking zones, and smooth road surfaces—directly impacts usability and rider comfort. Poor integration can lead to dissatisfaction, even if the scooter itself performs well.

Kazemzadeh and Sprei (2022) also developed a framework to assess the "level of service" for e-scooter riders, showing how elements like road quality and traffic safety can influence how positively or negatively users perceive their riding experience.

2.3. Factors affecting the electric scooter user experience

2.3.1. Urban Infrastructure and Road Conditions

The quality of the urban environment is one of the most critical factors for the daily use of private electric scooters. The presence (or absence) of safe and continuous infrastructure determines the frequency and comfort of use.

Kazemzadeh & Sprei (2022) developed an "Electric Scooter Level of Service (e-SLOS)" model, which measures how urban infrastructure impacts the perception of safety, comfort, and efficiency. Their research shows that aspects such as the continuity of bike lanes, public lighting, and clear signage have a direct effect on user satisfaction.

In contexts like Arequipa, uneven sidewalks, aggressive motorized traffic, and limited dedicated infrastructure force users to adapt their commutes, creating a less fluid and more stressful experience.

Currans et al. (2022) emphasize that intermodality also matters. The possibility of combining scooters with other modes of transportation (such as buses or the metro) improves the user experience, but in Arequipa, this integration does not yet formally exist.

2.3.2. Vehicle Performance and Reliability

Private scooters present enormous technical variability, from basic models to advanced versions with dual suspensions, extended batteries, and smart connectivity. These differences directly influence the user's daily experience.

Gisbert (2019) emphasizes the importance of technical variables such as range, maximum speed, braking capacity, and ergonomics. On uneven or sloping terrain like those in Arequipa, engine power and wheel quality make a significant difference.

Deepika (2024) adds that ease of maintenance and the availability of local spare parts are key factors. In cities where there are no specialized repair shops, a breakdown can leave the user without mobility for several days.

Huang (2024) found that confidence in vehicle reliability is positively correlated with frequency of use. The more robust and reliable the scooter, the more its owner uses it.

2.2.3. Perceived Safety and Risk Management

Although private users tend to have more experience and mastery of the vehicle, risk perception remains a determining factor in their experience.

Szemere & Nemeslaki (2023) found that owners develop defensive routines, such as avoiding certain routes or using personal protection. This demonstrates that perceived safety goes beyond urban design, including personal habits, riding times, and level of trust in the environment.

Gyeong et al. (2025) showed that even when accidents are rare, the feeling of vulnerability can generate anxiety and reduce use at night or in the rain.

In Arequipa, where there is no separate infrastructure or clear regulations, many owners choose to wear helmets, additional lights, or even cameras, which affects their comfort and freedom of use.

2.3.4. User Motivation and Lifestyle Factors

This variable refers to the personal motivations and lifestyle factors that drive people to adopt and continue using electric scooters as part of their daily lives.

Hardt & Bogenberger (2018) found that the most common motives among owners are commute time efficiency, schedule flexibility, and the desire to avoid crowded public transportation.

Kjaerup & Mikael (2021) added that environmental sustainability is a strong motivation among young adults, who value its contribution to reducing emissions.

In Arequipa, these motives may be even more relevant: dense traffic, inefficient public transportation, and urban topography make the scooter a tool for gaining autonomy, especially among students and young workers.

2.3.5. Economic Cost-Benefit Perception

The user-owner constantly evaluates whether the scooter represents a profitable investment compared to other forms of transportation.

Mehzabin (2024) highlights that factors such as the initial price of the scooter, fare savings, electric charging costs, and maintenance costs are part of the user's subjective economic analysis.

Kopplin et al. (2021) show that, while the initial cost may seem high, frequent users can quickly recoup that investment if they replace public transportation or taxis.

In cities like Arequipa, where the average salary is lower than in Europe or the US, the acquisition and repair costs can be a deterrent, leading many users to opt for affordable models, even if this means less comfort.

VARIABLES

Tabla 1 Summary of Variables

Type	Variable Name	Description
Dependent Variable	User Experience of E-Scooter Owners	Subjective perception of using an e-scooter, including comfort, ease of use, enjoyment, and integration into daily routine. Excludes safety and economic cost.
Independent Variable	Urban Infrastructure and Environment	Quality and availability of bike lanes, road surfaces, street lighting, and interaction with traffic in Arequipa.
Independent Variable	Technical Performance of the Scooter	Features related to usability such as battery range, speed, stability, and physical condition of the scooter.

Independent Variable	Perceived Safety and Risk	User perception of personal safety when riding, considering accidents, traffic conditions, and urban lighting.
Independent Variable	User Motivation and Lifestyle Fit	Reasons for use (e.g., convenience, time saving, environmental awareness) and how it fits into users' habits and needs.
Independent Variable	Economic Cost-Benefit Perception	Users' evaluation of whether owning and maintaining the scooter is worth the cost.

RESEARCH OBJECTIVES

General Objective

- To analyze the key factors that influence the user experience of electric scooter owners in the context of urban transportation in Arequipa, Peru.

Specific Objectives

1. To evaluate how urban infrastructure and environmental conditions in Arequipa affect the overall user experience of e-scooter owners.

2. To examine the role of technical performance of electric scooters in shaping the comfort and satisfaction of their users.

3. To analyze users' perceptions of safety and how these perceptions influence their overall experience.

4. To identify how users' motivations and lifestyle compatibility impact the way they experience and adopt e-scooter use.

5. To assess how users perceive the cost-benefit relationship of owning an electric scooter and how this affects their level of satisfaction.

RESEARCH HYPOTHESES

General Hypothesis

H_0 (Null Hypothesis): There is no significant relationship between the analyzed factors and the user experience of electric scooter owners in Arequipa, Peru.
H_1 (Alternative Hypothesis): The analyzed factors significantly influence the user experience of electric scooter owners in Arequipa, Peru.

Specific Hypotheses

1. H1: Urban infrastructure and environmental conditions in Arequipa significantly influence the user experience of electric scooter owners.

2. H2: The technical performance of electric scooters positively affects the comfort and satisfaction perceived by their owners.

3. H3: Users' perception of safety and risk while riding an e-scooter has a significant effect on their overall user experience.

4. H4: Personal motivations and compatibility with lifestyle significantly shape the way users experience e-scooter use.

5. H5: The perception of the cost-benefit relationship of owning an electric scooter is positively associated with user satisfaction.

3. METHODOLOGY

3.1 Research Design

This study adopts a quantitative, descriptive-correlational design, aimed at analyzing the relationship between various independent variables such as urban infrastructure, technical performance, perceived safety, lifestyle fit, economic perception, and regulatory awareness—and the user experience of individuals who own and use electric scooters in Arequipa, Peru.

This research is not based on controlled experiments but rather seeks to measure and evaluate naturally occurring conditions to determine their impact on the overall user experience. This approach is appropriate for understanding patterns and correlations that may guide urban planning, micro mobility policies, and future research on sustainable transportation in similar urban contexts.

3.2 Population and Sample

The target population for this study consists exclusively of adult residents of Arequipa who own and actively use electric scooters for urban transportation. Shared scooter users and those who use scooters only occasionally or recreationally are excluded from the sample.

A non-probability purposive sampling method was applied, selecting participants who met the specific ownership and usage criteria. A minimum of 50 valid responses was established as the sample size threshold to ensure meaningful statistical analysis, while acknowledging the practical constraints of conducting primary data collection.

3.3 Data Collection Instrument

The primary data collection tool was a structured survey developed by the researcher based on a comprehensive review of academic literature. The questionnaire was validated through a pilot review and revised accordingly. It was written in Spanish, the native language of the participants, to ensure clarity and accuracy.

The survey included closed-ended questions grouped into the following thematic sections:

- User Profile
- Ease of Use

- Perceived Safety
- Urban Infrastructure
- Cost and Maintenance
- Motivation and Lifestyle Fit
- Overall Experience

Most questions used a five-point Likert scale, ranging from "Strongly disagree" to "Strongly agree", or from "Very easy" to "Very difficult", depending on the construct measured.

3.4 Data Collection Procedure

The survey was distributed online using Google Forms, allowing participants to respond anonymously at their convenience. The link was shared through social media platforms, community forums, and local groups in Arequipa, targeting individuals who met the inclusion criteria.

To increase reliability, participants were reminded of the academic purpose and anonymity of the study, and the estimated response time was kept below 7 minutes.

3.5 Data Analysis Techniques

This study employed a quantitative approach to analyze the relationships between user satisfaction and a set of explanatory variables derived from survey responses. The analysis was divided into two main phases: (1) correlation analysis using Spearman's rank correlation coefficient, and (2) predictive modeling using a binary logistic regression model.

3.5.1 Spearman Rank Correlation Analysis

Given that the survey responses were based on Likert-type ordinal scales, Spearman's rank correlation coefficient (ρ) was selected as the most appropriate method to measure the strength and direction of associations between the variables.

Spearman's ρ evaluates monotonic relationships by comparing the ranked values of two variables rather than their raw numerical values. This method does not assume a linear distribution and is more robust for ordinal data compared to Pearson's correlation.

In this study, Spearman's ρ was used to assess the relationship between the dependent variable (User Experience) and each composite independent variable, including:

- Ease of Use
- Safety
- Infrastructure
- Cost Perception
- Motivation

The results from this analysis provided a preliminary understanding of the relative influence of each factor on user satisfaction.

3.5.2 Binary Logistic Regression Model (Logit)

To further analyze the determinants of user satisfaction, a logistic regression model (logit) was used. This required transforming the dependent variable "User Experience" into a binary variable:

- 1 = "Satisfied" or "Very Satisfied"
- 0 = "Neutral", "Dissatisfied", or "Very Dissatisfied"

The logit model estimates the probability that a respondent is satisfied as a function of the independent variables. These variables were included as composite indices, each constructed by averaging two related survey items, after being converted to ordinal numerical scales.

This approach allowed the study to identify which variables increased or decreased the likelihood of user satisfaction, while taking into account the ordinal nature of the data and the need for a probabilistic interpretation of outcomes.
Although the model did not produce statistically significant predictors, it provided important insights into the direction and potential influence of each explanatory factor.[2]

3.6 Ethical Considerations

The study strictly adhered to ethical research standards. Participants were informed of the voluntary nature of the survey, and no personal identifying data was collected. All responses were kept anonymous and confidential. The data was used exclusively for academic purposes within the scope of the master's thesis.

4. RESULTS

This section presents the results obtained from the structured survey conducted among 170 private electric scooter owners in Arequipa, Peru. The findings are organized according to the phases outlined in the methodology: descriptive analysis, construction of composite variables, correlation analysis, binary transformation of the dependent variable, and logistic regression modeling. The results are interpreted in light of the research objectives and hypotheses defined in earlier sections.

4.1 Descriptive Analysis

The survey was completed by 170 adult users who currently own and regularly use electric scooters in the urban setting of Arequipa. This sample size exceeds the initial minimum target of 50 responses, ensuring sufficient data for correlation and regression analysis.

4.1.1. Demographic Profile

[2] Although the variable "Perceived Safety and Risk" was originally measured on a 5-point Likert scale and therefore corresponds to an ordinal categorical variable, it was treated as a continuous variable in the regression model. This approximation was made to simplify the analysis and interpret the effect size through the logit coefficient and odds ratio. It is acknowledged that treating ordinal data as continuous may affect the statistical inference, and future research may consider using alternative models (e.g., ordinal logistic regression) to assess the potential impact of this classification choice.

- Age: The majority of respondents were between 18 and 34 years old, with the largest single group being 25–34. This reflects the youthful demographic often associated with early adoption of micro-mobility technologies.

- Gender: Most respondents identified as male, though a considerable proportion were female, indicating a moderately gender-diverse user base.

- Education level: A high percentage held a university degree or postgraduate qualification, suggesting that electric scooter users in Arequipa tend to be relatively well-educated.

4.1.2. Usage Patterns

- Frequency of use: Over 65% of respondents reported using their scooter every day or several times a week, indicating high integration into daily routines.

- Duration of use: The most common average ride duration was 10–30 minutes per day, followed by less than 10 minutes, suggesting the dominance of short urban trips, consistent with micro-mobility trends globally.

4.1.3. Overall Satisfaction and Recommendation

When asked about their overall satisfaction:

- More than 70% of users reported being either “satisfied” or “very satisfied”.

- Less than 15% of respondents expressed dissatisfaction, and the remainder were neutral.

Furthermore, the vast majority of users indicated that they would recommend the use of electric scooters to others in Arequipa. This high level of satisfaction and willingness to recommend suggests that, despite urban challenges, e-scooters are perceived as a practical and valuable transport option.

4.2 Construction of Composite Variables

In order to align the analysis with the conceptual framework and hypotheses, the following five composite independent variables were developed:

1. Urban Infrastructure and Environment: Combined with the ease of accessing roads/paths suitable for scooters and the perceived adaptation of Arequipa's infrastructure.

2. Technical Performance of the Scooter: Combined the ease of riding and the ease of charging/maintenance.

3. Perceived Safety and Risk: Measured by the user's subjective sense of safety while riding in Arequipa.

4. User Motivation and Lifestyle Fit: Measured by the degree to which the scooter aligns with the user's daily needs (work, school, leisure).

5. Economic Cost-Benefit Perception: Combined the perceived affordability of the scooter's purchase price and the impact of maintenance costs.

The dependent variable, User Experience, was operationalized through a question on overall satisfaction with the e-scooter experience, measured on a 5-point Likert scale.

4.3 Spearman Rank Correlation Analysis

A Spearman correlation analysis was conducted to evaluate the strength and direction of the monotonic relationships between each independent variable and the user experience. This non-parametric method is appropriate for ordinal data and captures relationships without assuming linearity.

Tabla 2: Spearman Rank Analysis

Variable	Spearman's ρ	p-value	Interpretation
Perceived Safety and Risk	0.447	< 0.001	Moderate positive and statistically significant
Technical Performance	0.383	< 0.001	Moderate positive and significant
Urban Infrastructure and Environment	0.361	< 0.001	Moderate positive and significant
Economic Cost-Benefit Perception	0.233	0.002	Weak but significant
User Motivation and Lifestyle Fit	0.222	0.003	Weak but significant

These results confirm that all five factors have a positive and statistically significant relationship with user satisfaction. Notably, perceived safety emerged as the most strongly correlated factor, reinforcing its central role in shaping user perceptions of e-scooter viability.

4.4 Binary Transformation of the Dependent Variable

To allow for predictive modeling through logistic regression, the ordinal satisfaction variable was transformed into a binary variable:

- Value 1 was assigned to users who reported being "satisfied" or "very satisfied".

- Value 0 was assigned to responses marked as “neutral”, “dissatisfied” or “very dissatisfied”.

This transformation enables the estimation of the probability that a user reports a satisfactory experience, based on their perception of the five independent variables.

4.5 Binary Logistic Regression Model

To evaluate which factors significantly predict user satisfaction with electric scooters, a binary logistic regression was conducted. The dependent variable was the binary transformation of user experience, where:

- 1 = satisfied or very satisfied
- 0 = neutral, dissatisfied, or very dissatisfied

The model included the five composite independent variables:

- Urban Infrastructure and Environment
- Technical Performance
- Perceived Safety and Risk
- User Motivation and Lifestyle Fit
- Economic Cost-Benefit Perception

Additionally, a constant (intercept) term was included in the model using “sm.add_constant()”. This is standard practice in regression modeling because it allows the model to estimate a baseline probability when all independent variables are equal to zero. In logistic regression, the intercept determines the log-odds of the outcome occurring in the absence of any predictors. Without it, the model assumes a 50% probability by default, which is rarely appropriate.

One observation was excluded from the analysis due to missing data in the economic variable.

Regression Results

Tabla 3 Binary logistic regression table

Variable	Coefficient (β)	Std. Error	p-value	Odds Ratio	Statistically Significant?
Intercept	–3.45	1.28	0.007	0.032	Yes
Urban Infrastructure and Environment	0.296	0.185	0.109	1.34	No
Technical Performance	0.285	0.235	0.227	1.33	No
Perceived Safety and Risk	0.483	0.163	0.003	1.62	Yes
User Motivation and Lifestyle Fit	0.063	0.162	0.696	1.07	No
Economic Cost-Benefit Perception	–0.002	0.229	0.991	1.00	No

Interpretation of Results

- Perceived Safety and Risk was the only variable that showed a statistically significant effect ($p = 0.003$). The odds ratio of 1.62 implies that a one-point increase in perceived safety increases the likelihood of user satisfaction by 62%, holding other variables constant.

- Urban Infrastructure and Technical Performance had positive coefficients and odds ratios above 1, suggesting they are positively associated with satisfaction. However, their effects were not statistically significant ($p > 0.05$).

- User Motivation and Economic Perception had minimal or null effects in the regression model. In particular, Economic Cost-Benefit Perception, which had shown a weak correlation in earlier analysis, had no significant predictive power in this model ($\beta \approx 0$, $p = 0.991$).

4.6. Summary of Results

This section summarizes the key findings derived from the statistical analyses performed on the data collected from 170 electric scooter owners in Arequipa. The purpose is to synthesize both the descriptive and inferential results and clarify the extent to which each independent variable influences the user experience.

4.6.1. Descriptive and Correlational Highlights

- The majority of users were young adults with higher education, using their scooters frequently for short urban commutes.

- Over 70% of users reported being satisfied or very satisfied with their experience.

- Spearman rank correlation analysis indicated that all five independent variables—Urban Infrastructure, Technical Performance, Perceived Safety, Economic Cost-Benefit, and Motivation—were positively and significantly correlated with user satisfaction ($p < 0.05$).
    - The strongest correlations were observed with Perceived Safety ($\rho = 0.447$) and Technical Performance ($\rho = 0.383$).

4.6.2. Regression Model Insights

- A binary logistic regression was applied to predict the probability of user satisfaction.

- Only Perceived Safety and Risk emerged as statistically significant ($p = 0.003$) with an odds ratio of 1.62, meaning each one-point increase in safety perception raised the odds of being satisfied by 62%.

- Other variables such as Urban Infrastructure and Technical Performance had positive but non-significant coefficients.

- Surprisingly, Economic Cost-Benefit Perception had no predictive effect ($p = 0.991$) in the regression model, despite its relevance in preliminary analysis.

4.6.3. Synthesis

The results highlight that, while all five factors are relevant in a correlational sense, only Perceived Safety and Risk has a clear, independent, and statistically validated impact on the likelihood of a satisfactory user experience. This underscores the dominant role that safety perception plays in micro mobility satisfaction, especially in urban environments where formal infrastructure and regulation may be lacking.

These findings provide strong empirical grounding for the interpretation and discussion in the next chapter, particularly regarding the validation of the study's hypotheses and implications for urban mobility planning.

5. DISCUSSION OF RESULTS

This section interprets the empirical findings presented in Section 4 in light of the research objectives, hypotheses, and theoretical framework. The analysis explores the meaning and implications of each independent variable's influence on the user experience of electric scooter owners in Arequipa. The discussion also positions these findings within the broader academic literature on micro mobility, highlighting unique insights specific to the urban context of a mid-sized Latin American city.

5.1 General User Patterns

The descriptive analysis reveals a demographic and behavioral profile that aligns with broader international studies on micro mobility but also reflects specific characteristics of the Arequipa context. Users are primarily young adults (18–34 years old) with higher education levels, consistent with prior research by Hardt & Bogenberger (2018) and Kopplin et al. (2021), which identifies younger, educated individuals as early adopters of new transportation modes. This demographic is more likely to value technological efficiency, environmental sustainability, and personal autonomy in urban transport choices.

More than two-thirds of respondents use their scooters on a daily or near-daily basis, indicating high dependence and strong integration into daily life. This frequency of use is noteworthy in a city where limited public transportation options and traffic congestion often compromise mobility. The fact that electric scooters are being adopted not only as a complement but in many cases as a primary mode of transportation suggests their perceived utility is quite high.

Furthermore, a strikingly high number of users report overall satisfaction and express willingness to recommend scooter usage to others. This reinforces the idea that, despite infrastructural and regulatory challenges, e-scooters are being perceived as a pragmatic and effective solution to urban transport problems.

5.2 Key Influencing Factors

The Spearman correlation and logistic regression results confirm that all five proposed variables have a statistically significant impact on user experience. However, the strength and nature of each variable's influence provides important insights into user expectations, frustrations, and behavior patterns.

5.2.1 Perceived Safety and Risk

Among all independent variables, Perceived Safety and Risk demonstrated the strongest and most statistically reliable relationship with user satisfaction.

In the Spearman correlation analysis, this variable showed a moderate positive and statistically significant association with the user experience ($\rho = 0.447$, $p < 0.001$). In the logistic regression model, it was the only statistically significant predictor of satisfaction ($\beta = 0.483$, $p = 0.003$). The odds ratio of 1.62 implies that for each one-point increase in the perception of safety (on a 5-point scale), the odds of reporting satisfaction increase by 62%, holding all other variables constant.

These results confirm that feeling safe while using an electric scooter is a crucial determinant of a positive user experience, particularly in the urban context of Arequipa, where traffic conditions, driver behavior, and infrastructure limitations present real and perceived risks to micro-mobility users.

This finding directly supports the literature discussed in Section 2.3 of the Literature Review, which emphasized the psychological and behavioral relevance of safety perception. For example, Szemere and Nemeslaki (2023) found that in environments with limited protective infrastructure, perceived vulnerability had a strong influence on riders' confidence and their willingness to use scooters regularly. Similarly, Gyeong et al. (2025) argued that perceived safety is often a more decisive factor than actual accident rates, as it shapes the rider's subjective comfort and reduces mental effort during commuting.

In the context of Arequipa, where the urban layout lacks formal infrastructure for scooter use and traffic enforcement is weak, users often rely on self-protective strategies, such as route optimization, travel time selection, and use of personal safety equipment. This aligns with Moura et al. (2020), who emphasized that in the absence of institutional support, user behavior compensates through adaptive strategies but only to a certain extent.

The significance of this variable in both correlational and predictive analysis highlights that no other factor, technical, economic, or motivational—can compensate for a low perception of safety. This suggests that urban interventions aimed at improving safety conditions for micro mobility users (e.g., better signage, speed regulation, protective lanes) are not only desirable but essential to increasing satisfaction and long-term adoption.[3]

5.2.2 Technical Performance of the Scooter

Technical performance refers to how users perceive the ease of riding, as well as the simplicity of charging and maintaining their electric scooter. This factor reflects the product's operational reliability and daily usability, which are expected to shape user satisfaction directly.

In the Spearman correlation analysis, Technical Performance demonstrated a moderate and statistically significant positive association with user experience ($\rho = 0.383$, $p < 0.001$), suggesting that users who perceive their scooter as easier to operate and maintain are more likely to report higher satisfaction levels.

However, in the binary logistic regression, Technical Performance had a positive coefficient of $\beta = 0.285$, but this effect was not statistically significant ($p = 0.227$). Its odds ratio of 1.33 indicates that the perceived ease of use is associated with higher odds of satisfaction, but this influence is not strong enough to be statistically confirmed when controlling for other factors such as safety and infrastructure.

These findings offer a partial confirmation of the theoretical expectations outlined in Section 2.1 of the Literature Review, which discussed the relevance of usability and handling in the everyday experience of e-scooter users. For instance, Gisbert (2019) highlighted that smooth handling and intuitive control systems reduce physical and cognitive stress for users, especially in traffic. Similarly, Deepika (2024) pointed out that battery range and charging convenience significantly affect perceived efficiency and freedom of movement in urban environments.

Nonetheless, the current study suggests that in Arequipa, these technical aspects—while valued—do not exert a statistically significant independent effect on satisfaction when perceived safety is included in the model. This divergence from expectations may be

[3] *It should be noted that "Perceived Safety and Risk" was modeled as a continuous variable, although it was originally collected as an ordinal variable. While this is a common approach in applied research, the decision may influence the statistical significance of other predictors. A different modeling approach that respects the ordinal nature of this variable could potentially reveal additional significant relationships.*

explained by contextual factors: in cities with low institutional support and irregular road conditions, basic technical functionality may be a necessary baseline, but not a sufficient driver of satisfaction. This interpretation aligns with Kazemzadeh and Sprei (2022), who argued that users adapt to technical limitations when more critical external factors, such as road safety and risk exposure, dominate their commuting experience.

In sum, while users appreciate technically reliable and easy-to-use scooters, this factor does not appear to be a decisive determinant of satisfaction in the Arequipa case. It plays more of a supporting role, potentially enhancing satisfaction only when more fundamental needs, like safety, are already met.

5.2.3 Urban Infrastructure and Environment

This factor assesses how well the urban environment of Arequipa supports the use of electric scooters through adequate access to routes and adaptation of physical infrastructure. It captures users' perceptions of how compatible the city's streets, sidewalks, and road systems are with e-scooter mobility.

According to the Spearman rank correlation analysis, Urban Infrastructure and Environment showed a moderate and statistically significant correlation with user satisfaction ($\rho = 0.361$, $p < 0.001$). This indicates that users who perceive better infrastructure conditions are generally more satisfied with their overall scooter experience.

However, in the binary logistic regression model, the coefficient for this variable was $\beta = 0.296$ ($p = 0.109$), which is not statistically significant at the conventional 5% level. The corresponding odds ratio of 1.34 suggests that the perceived quality of infrastructure is positively associated with satisfaction, but this relationship does not hold strong enough when other variables such as safety are included in the model.

These results offer partial support to the academic discussion in Section 2.2 of the Literature Review, where infrastructure is presented as a critical enabler of positive micro mobility experiences. For example, Kazemzadeh and Sprei (2022) emphasized that infrastructure such as dedicated lanes and flat surfaces contributes directly to user comfort and perceived legitimacy. Likewise, Currans et al. (2022) argued that the continuity and quality of riding paths are central to whether users adopt scooters as a daily transport option.

However, the findings from Arequipa reveal that although infrastructure influences satisfaction at the perceptual level, its predictive power weakens when modeled alongside more immediate experiential factors like safety. This reflects a contextual reality: in cities with limited infrastructure investment, users may adjust expectations or compensate through behavior, such as avoiding rough routes or selecting riding times strategically. This interpretation is consistent with Gisbert (2019), who noted that micro mobility users in Latin America often develop adaptive strategies to navigate infrastructure gaps.

Moreover, the result may also point to a threshold effect: while poor infrastructure can certainly deter use or cause dissatisfaction, improvements alone may not significantly boost satisfaction unless accompanied by institutional support and road safety measures. In this sense, infrastructure is a necessary but not sufficient condition for a positive user experience in Arequipa.

5.2.4 Economic Cost-Benefit Perception

This variable evaluates how users assess the financial aspects of owning an electric scooter, encompassing both the perceived reasonableness of the purchase cost and the impact of ongoing maintenance expenses. It reflects the economic rationality behind the adoption and sustained use of e-scooters.

In the Spearman rank correlation analysis, Economic Cost-Benefit Perception displayed a weak but statistically significant positive association with user satisfaction ($\rho = 0.233$, $p = 0.002$). This suggests that, at a descriptive level, users who perceive the cost and maintenance expenses as reasonable tend to be slightly more satisfied with their scooter experience.

However, when these factors are modeled within the binary logistic regression, the picture changes markedly. The regression yielded a coefficient of $\beta = -0.002$ ($p = 0.991$) for Economic Cost-Benefit Perception, with an odds ratio of approximately 1.00. This result indicates that, when controlling for other variables, variations in economic cost-benefit perception have no statistically significant effect on the odds of reporting satisfaction.

This discrepancy between the correlation and regression findings is informative. In the Literature Review (Section 2.3), economic considerations were identified as influential, with studies such as Mehzabin (2024) and Kopplin et al. (2021) reporting that cost factors often motivate the adoption of micro mobility solutions. Nevertheless, our findings suggest that while cost is important in the initial evaluation or adoption phase, it does not independently predict long-term user satisfaction among current owners in Arequipa.

One possible explanation is that, once users integrate the scooter into their daily routines, operational and safety concerns overshadow economic ones. In an environment where infrastructure and safety conditions are suboptimal, the financial aspect becomes less salient compared to aspects that affect the immediacy of the riding experience. Therefore, although users may initially weigh cost considerations, their ongoing satisfaction appears to be driven primarily by variables such as perceived safety and technical performance.

In summary, while a positive economic cost-benefit perception is present among users (as indicated by the weak correlation), it does not serve as a significant independent predictor of satisfaction in the multivariate model. This finding reinforces the notion that economic factors, although relevant, play a subsidiary role relative to more immediate experiential factors in shaping overall satisfaction with electric scooter use.

5.2.5 User Motivation and Lifestyle Fit

This variable captures the extent to which users perceive that their electric scooter aligns with their daily mobility needs—including commuting, studies, and leisure—as well as their broader lifestyle preferences, such as convenience, time efficiency, and personal autonomy.

The Spearman correlation analysis revealed a weak but statistically significant positive relationship between lifestyle fit and user satisfaction ($\rho = 0.222$, $p = 0.003$). This suggests that users who feel their scooter integrates well into their routines are slightly more likely to report a satisfactory overall experience.

In contrast, the logistic regression model showed a non-significant effect:

- The coefficient was $\beta = 0.063$, with a p-value of 0.696, and the odds ratio was 1.07.

- These results indicate that changes in lifestyle compatibility do not significantly affect the probability of user satisfaction when other variables are considered in the model.

These findings provide a nuanced reflection on the arguments presented in Section 2.4 of the Literature Review. Studies like Kjaerup and Mikael (2021) suggested that lifestyle compatibility plays a central role in the adoption and continued use of micro mobility, particularly among users seeking flexibility, autonomy, and time-saving alternatives. Moreover, Hardt and Bogenberger (2018) emphasized that the alignment between vehicle use and urban living patterns is essential for building long-term user satisfaction.

However, in the context of Arequipa, the results suggest that while lifestyle fit may influence adoption or initial engagement, it does not independently determine user satisfaction once the scooter becomes part of daily life. Users might initially choose a scooter because it matches their routine or values, but their long-term satisfaction appears to be more strongly shaped by practical issues such as safety and infrastructure conditions.

This interpretation is particularly relevant in cities like Arequipa, where the urban environment is not inherently supportive of micro mobility. Users may value the scooter's convenience but ultimately judge their experience based on how well the environment allows them to use that convenience effectively and safely.

In conclusion, User Motivation and Lifestyle Fit acts more as a facilitator of adoption than a predictor of satisfaction. Its weak and statistically non-significant influence in the regression model underscores the dominance of external, operational factors in shaping the ongoing experience of scooter users.

5.3 Overall Interpretation of the Logit Model

The overall interpretation of the logistic regression model is clear: among all factors evaluated, only the perception of safety has a statistically confirmed and meaningful influence on whether users feel satisfied with their scooter experience. Other variables such as infrastructure, technical performance, economic considerations, and lifestyle compatibility may contribute in supporting roles, but they do not emerge as independent predictors in the final model.

This reinforces the central conclusion that improving user-perceived safety is the most effective way to enhance satisfaction, and should therefore be the primary focus of urban mobility interventions related to electric scooters in Arequipa.

5.4 Hypotheses Review

The following hypotheses were established based on the literature review and the theoretical model guiding this research. Their validation is evaluated using the results from both the Spearman rank correlation and the binary logistic regression analyses.

General Hypothesis (H_1)

H_1: The variables Urban Infrastructure and Environment, Technical Performance, Perceived Safety and Risk, User Motivation and Lifestyle Fit, and Economic Cost-Benefit Perception significantly influence the user experience of electric scooter owners in Arequipa.

- Supported in part.
- All five variables showed positive and statistically significant correlations with user satisfaction in the Spearman analysis.
- However, in the logistic regression, only Perceived Safety and Risk had a statistically significant predictive effect ($p = 0.003$).

- Therefore, while these variables influence satisfaction descriptively, only one has a proven predictive impact when analyzed in combination.

Specific Hypotheses

H1: Urban Infrastructure and Environment significantly influences user experience.

- Spearman correlation: $\rho = 0.361, p < 0.001$ → Significant positive association
- Logit regression: $\beta = 0.296, p = 0.109$ → Not statistically significant
- Conclusion: Partially supported, It influences satisfaction at the perceptual level but is not an independent predictor.

H2: Technical Performance significantly influences user experience.

- Spearman correlation: $\rho = 0.383, p < 0.001$ → Significant positive association
- Logit regression: $\beta = 0.285, p = 0.227$ → Not statistically significant
- Conclusion: Partially supported — Operational usability is important but not decisive.

H3: Perceived Safety and Risk significantly influences user experience.

- Spearman correlation: $\rho = 0.447, p < 0.001$ → Significant
- Logit regression: $\beta = 0.483, p = 0.003$ → Statistically significant predictor
- Conclusion: Fully supported — The only variable that consistently predicts satisfaction.

H4: User Motivation and Lifestyle Fit significantly influences user experience.

- Spearman correlation: $\rho = 0.222, p = 0.003$ → Significant

- Logit regression: $\beta = 0.063$, $p = 0.696$ → Not significant
- Conclusion: Partially supported — Acts as a background factor but not predictive.

H5: Economic Cost-Benefit Perception significantly influences user experience.

- Spearman correlation: $\rho = 0.233$, $p = 0.002$ → Significant
- Logit regression: $\beta = –0.002$, $p = 0.991$ → Not significant
- Conclusion: Not supported → Cost perception shows no independent influence on satisfaction.

Only H3 (Perceived Safety and Risk) is fully supported by both analyses, confirming its central role in the user experience. The remaining hypotheses are either partially supported or not supported due to lack of statistical significance in the predictive model.

This reinforces the broader insight that subjective safety is the most decisive factor in determining whether e-scooter users in Arequipa are satisfied, while other elements—though relevant—play a secondary or indirect role.

6. CONCLUSIONS, RECOMMENDATIONS AND LIMITATIONS

6.1 Conclusions

This research aimed to identify and analyze the main factors influencing the user experience of private electric scooter owners in Arequipa, Peru, a mid-sized Latin American city with a developing urban infrastructure. Unlike most studies focused on scooter-sharing services, this research specifically addressed the needs and perceptions of individuals who personally own and operate electric scooters as part of their daily mobility routines.

Using a structured survey with 170 valid responses and a robust quantitative methodology—including correlation analysis and a binary logistic regression model—

this study provides both descriptive and inferential insights into the e-scooter user experience in Arequipa.

The analysis revealed that although all five proposed variables—Urban Infrastructure and Environment, Technical Performance, Perceived Safety and Risk, User Motivation and Lifestyle Fit, and Economic Cost-Benefit Perception—are positively associated with satisfaction in the correlation analysis, only Perceived Safety and Risk emerged as a statistically significant predictor in the regression model. This means that while users appreciate comfort, convenience, cost-efficiency, and infrastructure, their overall satisfaction depends most strongly on how safe they feel when riding their scooter in the city.

This finding supports the general hypothesis in part and confirms that urban micro mobility cannot be effectively improved without addressing perceived personal safety. It also demonstrates that cost and motivation—commonly emphasized in adoption literature—do not independently explain whether a user is satisfied once the scooter becomes part of everyday transport.

Ultimately, the study confirms that in Arequipa, a city with limited micromobility infrastructure and weak regulatory frameworks, electric scooter owners evaluate their experience not only based on product features or lifestyle alignment, but through a practical and risk-sensitive lens, in which feeling safe is a non-negotiable condition for satisfaction.

6.2 Recommendations

Based on the study's findings, the following recommendations are proposed to improve the electric scooter user experience in Arequipa. These suggestions are directed at urban planners, policymakers, mobility companies, and the users themselves.

For Urban Planners and Municipal Authorities:

- Prioritize investments in micro mobility infrastructure, especially the creation of dedicated lanes and well-maintained paths for scooters and bicycles.

- Improve lighting, traffic signage, and road surface quality in key scooter transit corridors to reduce user exposure to risk.

- Develop integrated micro mobility plans that connect scooters with public transportation systems, such as BRT stations and bike-sharing nodes.

For Policymakers and Regulators:

- Establish clear traffic rules and legal protections for electric scooter users to legitimize their presence on public roads.

- Promote the use of safety equipment, such as helmets and reflective gear, through awareness campaigns and possible incentives.

- Introduce data collection systems to monitor micro mobility use, accident reports, and infrastructure performance to support evidence-based decision-making.

For E-Scooter Manufacturers and Retailers:

- Focus on technical reliability, offering models adapted to Arequipa's terrain, including solid tires, good suspension, and durable batteries.

- Provide accessible maintenance services and spare parts, especially for less experienced users.

- Emphasize safety features and ergonomic design in promotional strategies, since user satisfaction depends more on feeling safe than on price or performance alone.

For Users and Advocates:

- Continue adopting safe riding practices, such as route planning, protective gear use, and adherence to traffic norms.

- Engage with local mobility initiatives to help shape inclusive, sustainable transport policies for the future.

- Communicate user needs through organized feedback channels, helping authorities better understand the everyday challenges of scooter commuting.

6.3. Limitations

A limitation of the present study is that the measurement of the economic cost-benefit perception aggregates respondents’ evaluations of purchase and maintenance costs, but does not explicitly measure how these perceptions relate to the actual price paid for the scooter. To address this gap in future research, it is recommended to include a direct question linking the respondent’s perceived cost-benefit to the exact purchase price (or price range) of their scooter. This would allow testing whether lower/higher purchase prices correspond to more favorable cost-benefit perceptions and whether price moderates the effect of economic perception on overall satisfaction. Operationally, adding a price-related item would enable more precise analysis (e.g., interaction terms in the logit model or subgroup comparisons by price brackets).

Practical recommendation: in future surveys, include a discrete price bracket variable (for example: < USD 150, USD 150–300, USD 301–500, > USD 500) and an item that asks explicitly “To what extent did the purchase price meet your economic expectations?” (5-point Likert). This will allow direct testing of whether the perceived cost-benefit is a function of actual price paid and improve policy recommendations for affordable micromobility options. As shown in the following example:

What is the purchase price range of your electric scooter?

- Less than PEN 600 (≈ < USD 150)
- PEN 600 – PEN 1,200 (≈ USD 150–300)
- PEN 1,201 – PEN 2,000 (≈ USD 301–500)
- More than PEN 2,000 (≈ USD 500)

To what extent did the purchase price meet your economic expectations?

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

Justification: Including a price-range variable enables (1) subgroup analysis by price brackets, (2) testing the correlation between actual price and economic cost-benefit perception (Spearman ρ), and (3) including price as a covariate or interaction term in the logistic regression (to test moderation effects). This addition addresses reviewers' request to explicitly link economic perception with price.

6.4 Final Reflection

This study contributes original and practical insights to the growing field of micro mobility research in the Global South. In contrast to studies based in high-income, infrastructure-rich cities, the case of Arequipa highlights the importance of contextualizing user experience in light of infrastructural, regulatory, and cultural constraints.

While much attention is given globally to cost savings and ecological benefits, the findings here suggest that in cities like Arequipa, user satisfaction with electric scooters is ultimately shaped by the perception of safety in an urban system that is still catching up with technological change.

Therefore, for electric scooters to thrive as a sustainable, inclusive, and efficient mode of transport in Arequipa and similar cities, efforts must go beyond affordability and product quality. Instead, they must focus on creating environments in which users feel safe and supported, both physically and institutionally, in their daily mobility choices.

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8. APPENDIX

8.1 Survey Questionnaire

Title: Factors Influencing the User Experience of Electric Scooter Owners in Arequipa, Peru
Target: People who own and regularly use electric scooters in the city of Arequipa
Format: Closed-ended questions (mostly Likert scale)
Estimated time: 5–7 minutes

Introduction:

Hello!

My name is Marco Rodrigo Huanqui Cornejo, and I am currently pursuing a Master's degree in International Management at the Université Catholique de Lille in France.
As part of my thesis project, I am conducting a study titled:
"Factors that influence the electric scooters users experience in the urban transportation in Arequipa, Peru."

The purpose of this survey is to better understand how people who own and use electric scooters in the city of Arequipa perceive their experience—considering aspects such as usability, safety, satisfaction, and how scooters fit into their daily lives.

Your responses are anonymous and confidential and will be used exclusively for academic purposes.

It will take approximately 5 to 7 minutes to complete.

If you are currently using your own electric scooter in Arequipa, your participation would be greatly appreciated and will help contribute to research on sustainable urban mobility in Peru.

Thank you very much for your time and support!
Best regards,

Marco Rodrigo Huanqui Cornejo

Section 1: User Profile

1. Age

- Under 18
- 18 – 24
- 25 – 34
- 35 – 44
- 45 – 54
- 55 or older

2. Gender

- Male
- Female
- Prefer not to say

3. Education level

- High school or lower
- Technical education
- University degree (Bachelor's)
- Postgraduate (Master's, PhD)

4. How often do you use your electric scooter?

   - Every day
   - Several times a week
   - Once a week
   - Occasionally

5. Average daily usage time

   - Less than 10 minutes
   - 10 – 30 minutes
   - 30 – 60 minutes
   - More than one hour

Section 2: Ease of Use

6. How easy is it for you to ride your electric scooter?

   - Very easy
   - Easy
   - Neutral
   - Difficult
   - Very difficult

7. How easy is it to charge or maintain your scooter?

   - Very easy
   - Easy
   - Neutral

- Difficult
- Very difficult

Section 3: Perceived Safety

8. Do you feel safe using your electric scooter in Arequipa?

- Very safe
- Safe
- Neutral
- Unsafe
- Very unsafe

9. Have you experienced any accidents or incidents while using your scooter?

- Yes
- No
- Prefer not to say

Section 4: Urban Accessibility

10. How easy is it for you to access roads or paths suitable for scooters in Arequipa?

- Very easy
- Easy
- Neutral
- Difficult
- Very difficult

11. How well is Arequipa's infrastructure adapted to electric scooters?

- Very well adapted
- Well adapted

- Neutral
- Poorly adapted
- Very poorly adapted

Section 5: Cost and Maintenance

12. Do you think the cost of purchasing your scooter was reasonable?

- Very reasonable
- Reasonable
- Neutral
- High
- Very high

13. Do maintenance costs affect your experience using the scooter?

- Yes, a lot
- Yes, somewhat
- No effect
- Not sure

Section 6: Motivation and Lifestyle Fit

14. What is your main reason for using your electric scooter?

- To avoid traffic
- Environmental concern
- To save money
- It's faster
- It's more comfortable

15. Does your electric scooter fit your daily needs (work, studies, leisure, etc.)?

- Strongly agree

- Agree
- Neutral
- Disagree
- Strongly disagree

Section 7: Overall Experience

16. Overall, how satisfied are you with your experience using your electric scooter?

- Very satisfied
- Satisfied
- Neutral
- Dissatisfied
- Very dissatisfied

17. Would you recommend using electric scooters to other people in Arequipa?

- Yes
- No
- Maybe

8.2 Graphics of the Results

Gráfico 1: Age

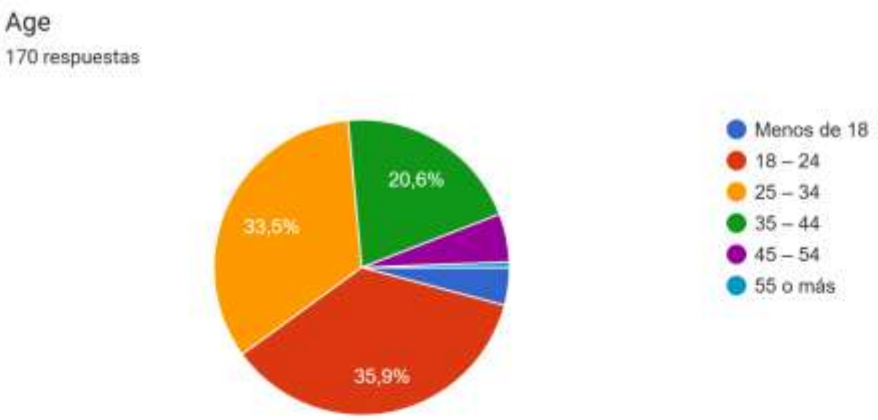

Gráfico 2 : Gender

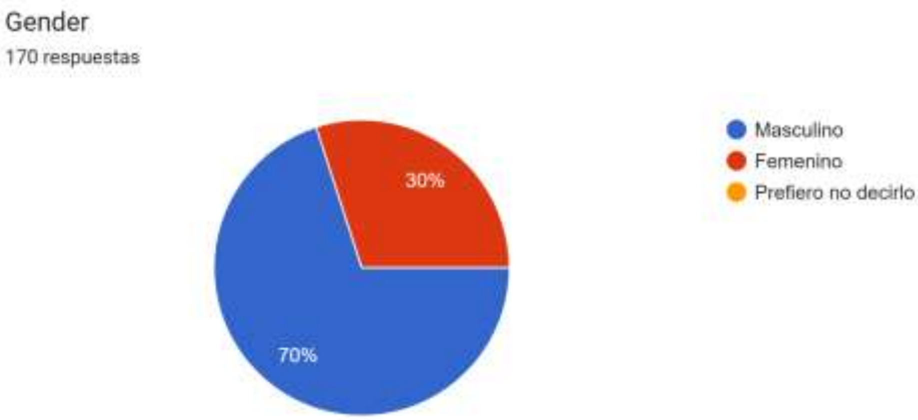

Gráfico 3: Level of education

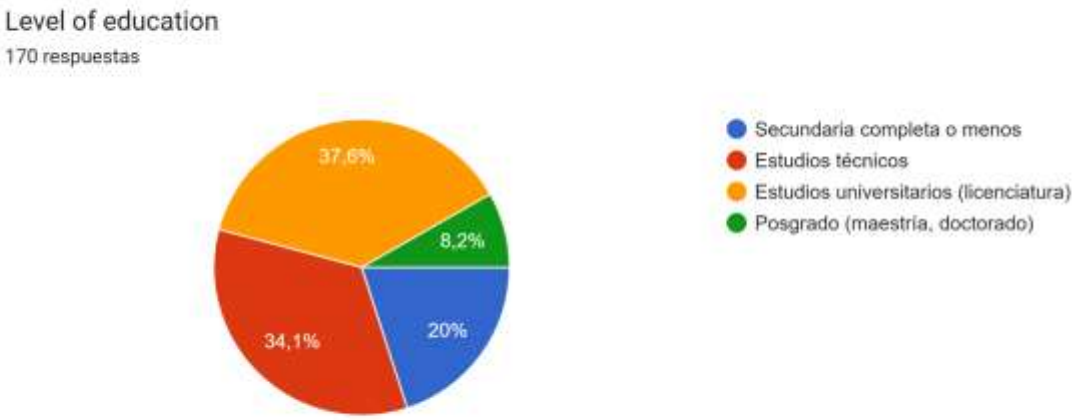

Gráfico 4: Frequency of use of the eclectic scooter

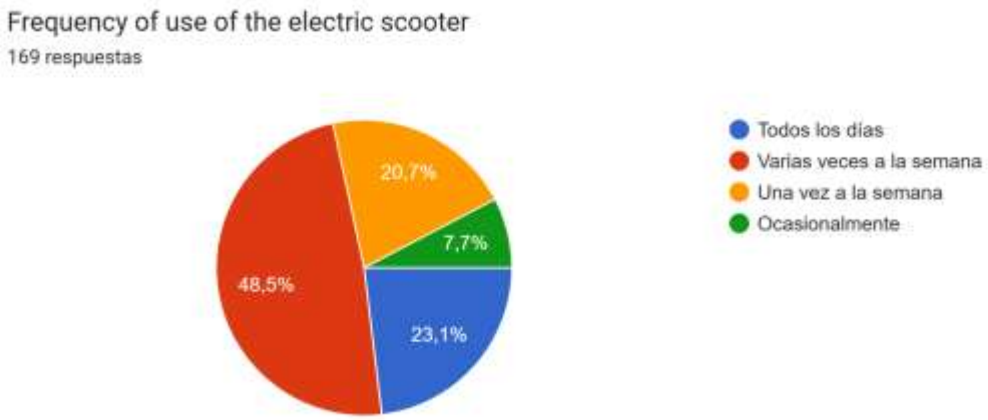

Gráfico 5: Average daily usage time of the electric scooter

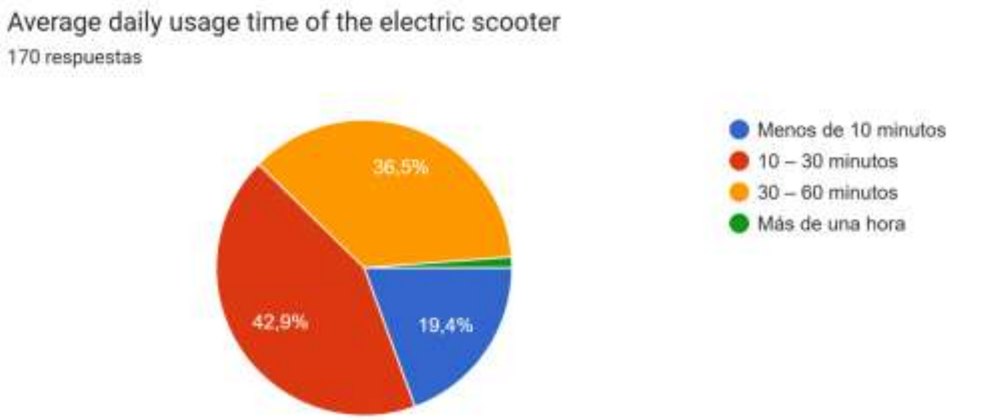

Gráfico 6: Easy to ride electric scooter

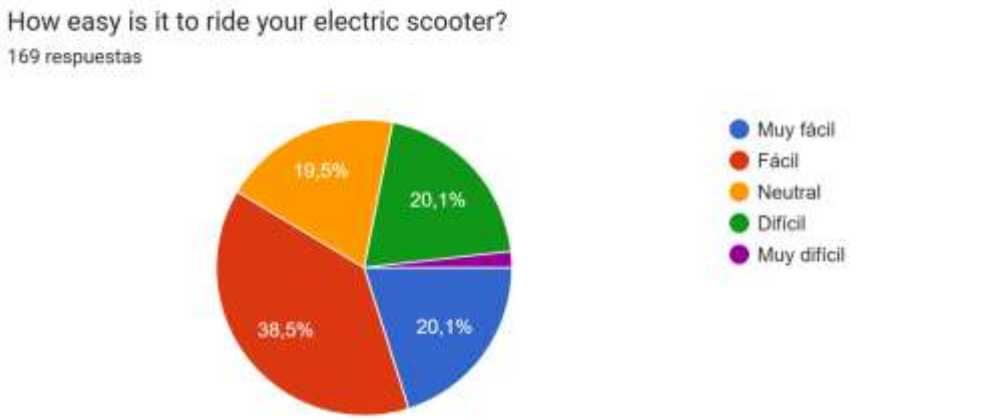

Gráfico 7: Easy to charge and maintain the electric scooter

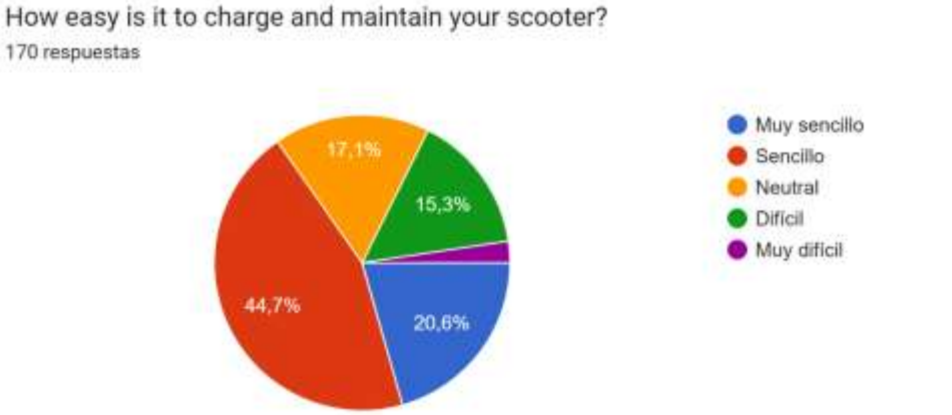

Gráfico 8: Safe use electric scooter in Arequipa

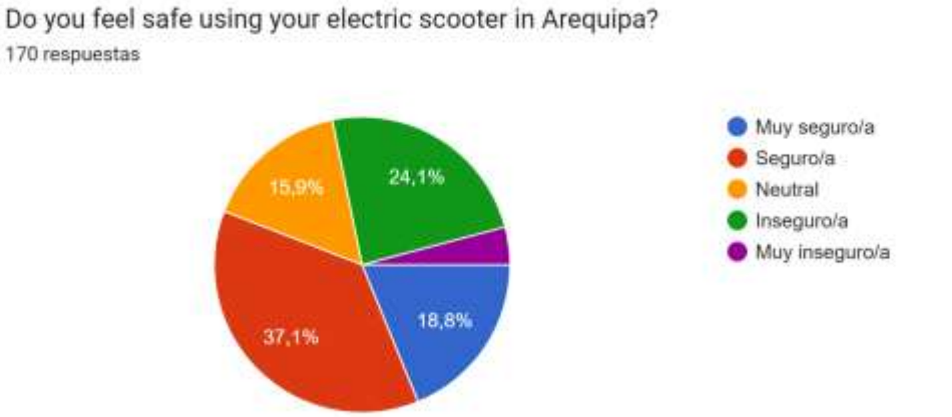

Gráfico 9: Accidents using scooter

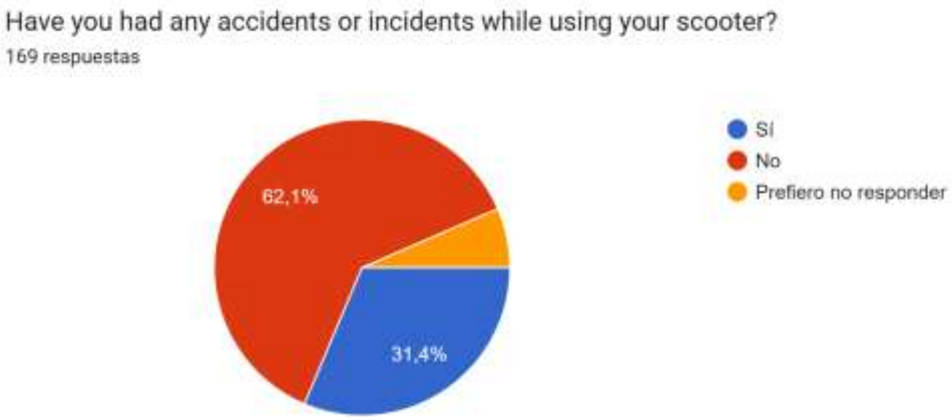

Gráfico 10: Easy to access the right roads

Gráfico 11: Urban infrastructure in Arequipa

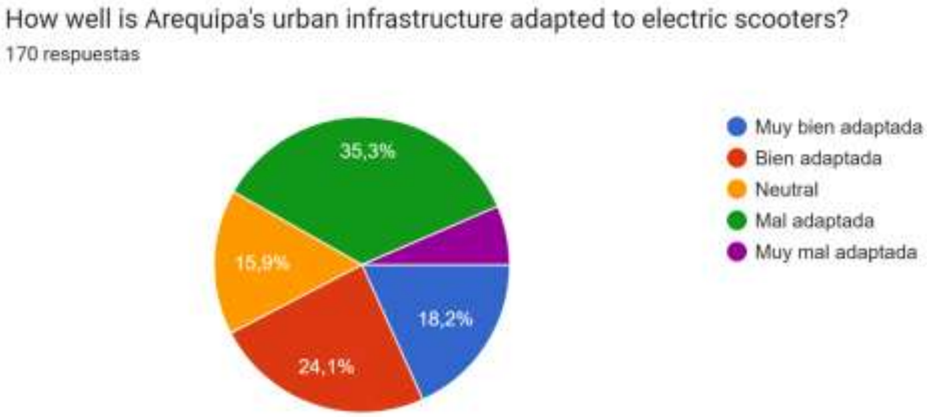

Gráfico 12: Cost of purchasing reasonable

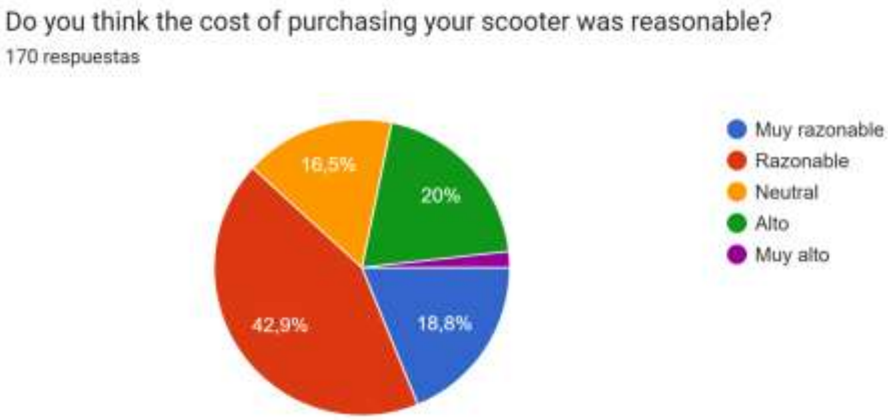

Gráfico 13: Scooter maintenance cost in relationship with the user experience

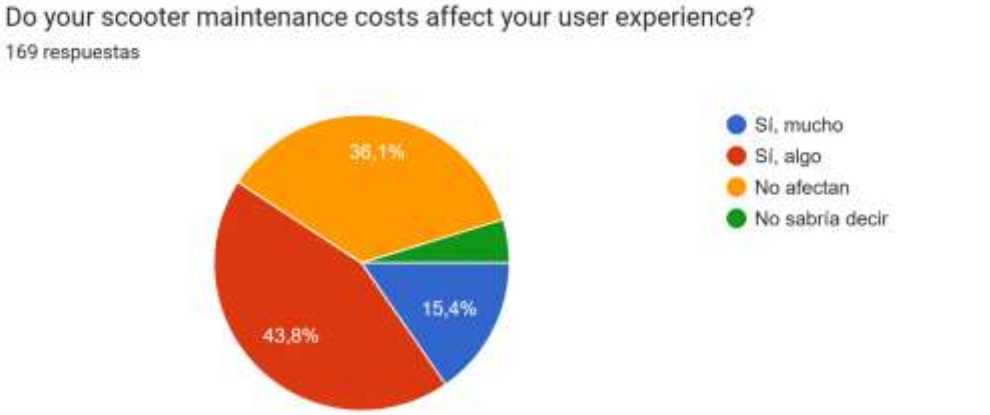

Gráfico 14: Motivation

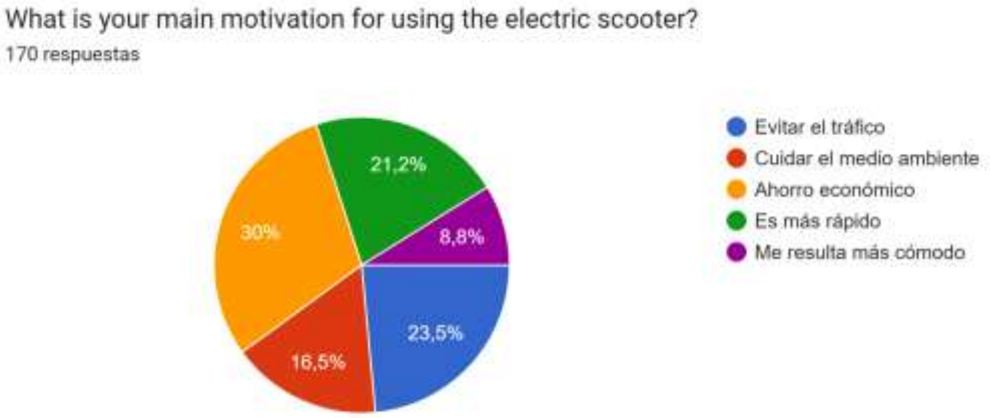

Gráfico 15: Lifestyle Fit

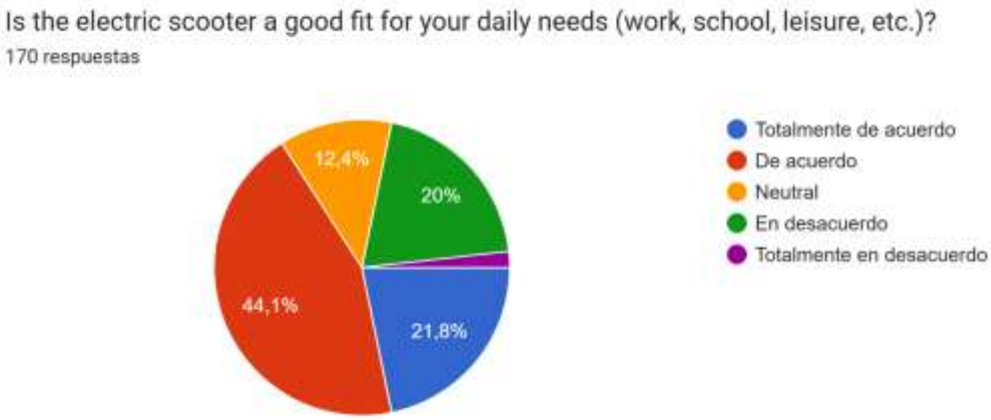

Gráfico 16: Satisfaction with the experience

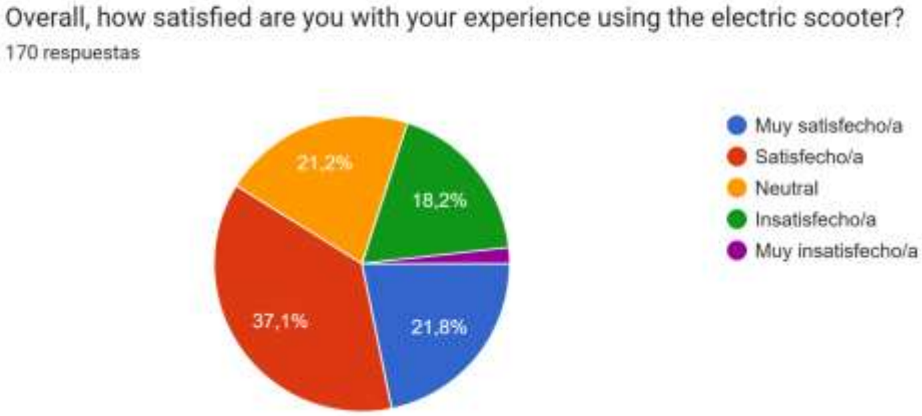

Gráfico 17: Recommendation