Impact of User Experience and Trust on Satisfaction and Their Effect on Loyalty in Last-Mile Delivery Services within Electronic Commerce in Metropolitan Lima, 2025

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Abstract

Last-mile delivery has emerged as a decisive factor shaping user satisfaction and the continued use of electronic commerce platforms. Following the pandemic, the surge in online purchasing accelerated the adoption of more flexible logistics solutions, such as pickup points and automated systems. However, user satisfaction still depends on elements such as timeliness, communication, and perceived safety during delivery—particularly in emerging digital markets such as Lima.

This study aims to determine how user experience and trust in delivery services influence user satisfaction, and how such satisfaction drives loyalty toward last-mile service providers within electronic commerce in Zones 6 and 7 of Metropolitan Lima. A quantitative approach with a correlational–causal scope guided the research, which relied on non-probabilistic convenience sampling applied to 387 participants. Data underwent analysis through partial least squares structural equation modeling (PLS-SEM).

The findings reveal that trust in the delivery service functions as the primary driver of user satisfaction. Regarding user experience, the pickup-contact dimension emerged as the most relevant positive predictor, whereas efficiency, parcel tracking, and visual appeal did not yield significant effects. Moreover, the results confirm that satisfaction constitutes an important antecedent of user loyalty, regardless of cultural context.

These insights underscore the need for companies to prioritize actions that strengthen trust and the human component of service delivery, while expanding the understanding of digital consumer behavior in an emerging and underrepresented market such as Peru.

Keywords: User experience, delivery service trust, satisfaction, loyalty, last-mile delivery, electronic commerce.

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Introduction

Electronic commerce has expanded rapidly due to advances in Internet technology, which have enabled the creation of online business initiatives (German et al., 2023). This growth accelerated during the coronavirus pandemic, as users adapted to new ways of acquiring products (RPP, 2021). Although the health emergency has ended, online purchasing continues holding its position as a preferred alternative (German et al., 2023). Consequently, last-mile delivery has evolved into a vital component for ensuring a positive ecommerce experience (Nguyen et al., 2016). According to Ismail and Jokonya (2023), this concept— which involves transporting products from distribution centers to their final destination— has shifted from a purely logistical process to an essential factor that drives differentiation and customer loyalty. Internationally, last-mile delivery now plays a strategic role in logistics (Hillyer, 2021). For instance, the rise of services such as Glovo and Rappi during lockdown highlighted their operational and commercial relevance (Inga, 2021).

Most research on satisfaction and loyalty in last-mile delivery originates from developed markets with stable infrastructure and options such as pickup points or automated lockers that support fast and predictable deliveries (Corejova et al., 2022). In contrast, user experience in emerging contexts depends more heavily on the interaction and trust in the delivery agent, given existing variability and logistical limitations (Trung et al., 2025). These disparities suggest that the drivers of satisfaction and loyalty may function differently in Metropolitan Lima, where digital adoption coexists with expectations of personalized interaction— a combination that justifies analyzing the Peruvian context.

In this setting, Oliver's (1980) satisfaction model provides a useful framework for understanding how the comparison between expectations and performance shapes user satisfaction and loyalty. This study employs that model to assess how user experience and trust in delivery services influence user satisfaction, and how such satisfaction, in turn, affects loyalty toward last-mile delivery (LMD) service providers.

Vrhovac et al. (2024) note that user experience plays a crucial role in shaping user satisfaction throughout the last-mile delivery process. Arhippainen and Tähti (2003) define user experience as the set of perceptions, emotions, and sensations emerging during interactions with a product or service. Norman (2013) expands the concept by integrating both emotional and functional aspects. This experience currently holds strategic relevance because it directly shapes brand perception: a positive experience strengthens customer relationships (Mofokeng, 2021), whereas a negative one may weaken loyalty and reduce repurchase intention (Prahiwan et al., 2021). Vrhovac et al. (2024) further emphasize its influence on overall satisfaction and the perception of the entire purchasing journey. This aligns with Kotler and Armstrong (2020), who argue that

satisfaction emerges when the service meets or exceeds expectations. In the context of electronic commerce, Vrhovac et al. (2023) identify six key dimensions of user experience: efficiency, parcel tracking, visual appeal, joyful anticipation, pickup contact, and convenience.

Trust in the delivery service constitutes another critical factor shaping user satisfaction. Ejdys and Gulc (2020) describe trust as consumers' perception of the integrity, honesty, and capability of delivery service providers to fulfill their commitments and deliver high-quality service. Nguyen et al. (2024) underscore the importance of guaranteeing a safe and reliable service to secure user satisfaction and eventual loyalty. Similarly, Davis et al. (2021) conclude that trust directly influences satisfaction and the intention to repurchase.

Huang and Nuangjamnong (2023) argue that high user satisfaction, grounded in product quality, customer service, and delivery efficiency, fosters brand loyalty. Vakulenko et al. (2019) add that measuring satisfaction helps companies identify opportunities for improvement and build profitable long-term relationships.

In Latin America, Peru stands out as the country with the highest ecommerce growth, reaching a 92% increase (Euromonitor, 2021). In the national context, Metropolitan Lima leads ecommerce activity due to high Internet penetration and widespread smartphone use (Centro Nacional de Planeamiento Estratégico [CEPLAN], 2025). Because it accounts for nearly 80% of ecommerce demand in the country (IPE, 2023), Metropolitan Lima was selected as the study area. The research focuses on Zones 6 and 7, as districts such as San Isidro, Surco, Miraflores, Lince, and San Miguel register the highest use of these services (Huertas, 2023).

Metropolitan Lima benefits from strong connectivity and the growth of digital payment methods, which have facilitated interactions between supply and demand while reducing entry barriers (CEPLAN, 2025). However, Lima also ranks first in traffic congestion in Latin America and faces major road infrastructure challenges that complicate urban distribution and hinder delivery efficiency. The city's saturated traffic— driven by rapid urban growth and high demand for rapid deliveries— affects logistics operations by inflating delivery times and transportation costs (Business Empresarial, 2025). Unlike Europe, where last-mile technologies such as drones, robots, and autonomous vehicles already transform customer expectations, enhance efficiency, and reduce costs (Aljohani, 2024; Karli & Tanyas, 2024), initiatives such as autonomous vehicles or smart lockers remain in pilot stages in Metropolitan Lima (Acuña, 2025).

In recent years, consumer behavior in Lima has shifted toward a preference for convenience, speed, and constant availability of products and services, reinforcing the importance of digital channels. Lima's millennials and centennials increasingly operate within specific time frames, which elevates their expectations regarding convenience and immediacy in deliveries (García, 2025). Trust, however, continues guiding digital adoption: consumers value transparent pricing, safety when receiving deliveries, and the option to pay upon delivery. Although the use of cards and digital wallets has grown significantly, cash-on-delivery remains common, as many consumers view it as protection against fraud (García, 2025). Indeed, 95% of Lima's consumers use digital wallets, yet 84% believe they lack adequate protection against online fraud— a sign of digital adoption accompanied by distrust (Comercio, 2025). Despite logistical advances, a gap persists in understanding how user experience shapes satisfaction, particularly in Peru, where studies frequently emphasize operational aspects while overlooking key emotional variables.

Academically, this study contributes to the literature on last-mile delivery in the Peruvian context by incorporating underexplored emotional dimensions such as joyful anticipation and visual appeal. Practically, it provides ecommerce firms in Metropolitan Lima with insights to strengthen trust, delivery-agent interaction, and service convenience. Socially, it highlights the expectations of a young audience, helping align consumption experiences with real user needs.

Given these considerations, the study aims to examine how customer experience and trust in delivery services shape user satisfaction, and how such satisfaction influences loyalty toward last-mile delivery providers in Zones 6 and 7 of Metropolitan Lima.

Last-Mile Delivery

Last-mile delivery corresponds to the final stage of distribution in which parcels travel from a delivery hub to the end consumer, functioning as a critical link due to its impact on time and cost efficiency (Masorgo et al., 2024). In the current landscape—and driven by new consumption patterns that emerged during the COVID-19 pandemic—companies increasingly rely on technologies such as drones and autonomous vehicles to accelerate last-mile deliveries, particularly in urban areas (Lemardelé et al., 2021). In this regard, Min (2023) argues that integrating drones and autonomous vehicles accelerates deliveries and alleviates congestion in dense urban environments, whereas Akdoğan and Özceylan (2022) highlight how artificial intelligence strengthens last-mile logistics through algorithms that allocate orders, plan routes in real time, and enhance the use of logistical resources.

Another major innovation in last-mile logistics involves the rise of mobile delivery applications, which have reshaped the way users interact with companies and make purchases (Karimov, 2023). For instance, applications such as Rappi and Pedidos Ya have transformed the purchasing experience by allowing users to place orders and track deliveries in real time (Euromonitor, 2022).

In the Peruvian context, IPE (2023) reports that delivery applications accounted for nearly one-third of total commercial revenue during the analyzed period. Likewise, SmartMe Analytics (as cited in Fritas, 2024) indicates that 61% of consumers use these platforms as their primary channel for acquiring goods, spending on average more than 400 soles per week. This trend demonstrates not only the consolidation of last-mile delivery as a central component of electronic commerce in the country but also the growing dependence of its efficiency on advanced technological solutions.

User Experience

According to Arhippainen and Tähti (2003), user experience refers to the perceptions and emotions that individuals develop while interacting with a product or service in a specific context. Within last-mile delivery, this process emerges as one of the most complex and costly

challenges, since user satisfaction may shift between the online retail stage and the post-shipment phase. Even when online purchasing generates high satisfaction, that perception may decline if the customer feels dissatisfied with the delivery process (Risberg, 2022). To measure this variable, the study adopted the six dimensions proposed by Vrhovac et al. (2023).

Efficiency (UX1)

Delivery services create opportunities to offer products in a personalized, convenient, and efficient manner, which helps build long-lasting relationships with users, generate competitive advantages, and strengthen user satisfaction (Uzir et al., 2021). According to Vrhovac et al. (2023), the concept refers to users' preference for accuracy and professionalism in the delivery of their orders.

Delivery efficiency encompasses several key aspects, among which reliability stands out. It requires that products arrive under the promised conditions—an element that sustains user trust and reinforces satisfaction. Moreover, timely and precise delivery of products, consistent with the conditions established by the online seller, exerts a direct and significant impact on user satisfaction (Lai et al., 2022).

Minimizing errors throughout the logistics process also proves essential for securing efficient delivery. Shrinivas and Shafighi (2022) note that delivery accuracy functions as a decisive factor in logistics performance because it shapes user satisfaction. Under this perspective, logistical inefficiencies during the delivery process negatively affect customers' perceptions of both electronic retailers and companies providing last-mile delivery services (Shrinivas & Shafighi, 2022). Similarly, Merkert et al. (2022) found that customers value delivery efficiency, as they seek to avoid delays, product errors, and lost packages; thus, an efficient delivery process contributes to a positive user experience that directly influences satisfaction. Nonetheless, Vrhovac et al. (2024) conclude that although delivery efficiency exerts a positive effect on user experience, this dimension plays a less decisive role compared with others.

H1: User experience in the efficiency dimension exerts a positive and significant influence on final-user satisfaction with last-mile delivery services in the electronic commerce context.

Parcel Tracking (UX2)

Parcel tracking refers to the behavior of actively monitoring the status of the ordered item (Vrhovac et al., 2023). Today, the use of shipment-tracking systems in online purchases plays a crucial role for customers, as these tools allow them to follow their orders closely and access precise information regarding delivery times and locations (Vrhovac, 2024).

Studies on user preferences when purchasing through digital channels reveal a growing interest in gaining greater control over the delivery process and the ability to oversee shipment status through advanced technologies (Rajendran & Wahab, 2022). For this reason, technologies such as real-time parcel tracking are perceived as essential: they not only raise user satisfaction but also provide valuable data for improving last-mile delivery services (Aljohani, 2024).

In this regard, De Souza et al. (2022) found that integrating mobile applications to manage and track orders positively influences user satisfaction. Similarly, Nguyen et al. (2016) reported that the availability of parcel-tracking options significantly shapes user satisfaction because tracking reduces uncertainty about the delivery and gives consumers a sense of control over their orders during the waiting period. Cheng et al. (2021) likewise concluded that parcel tracking exerts a positive and significant influence on user satisfaction.

In the same line, Kawa and Swiatowiec-Szczepanska (2021) found that parcel tracking positively and significantly affects user satisfaction, reinforcing the need for companies aiming to excel in electronic commerce to prioritize transparency and accuracy in communicating order status and delivery or pickup locations. However, Vrhovac et al. (2024) concluded that parcel tracking did not significantly predict user satisfaction.

H2: User experience in the parcel-tracking dimension exerts a positive and significant influence on final-user satisfaction with last-mile delivery services in the electronic commerce context.

Visual Appeal (UX3)

In their study, Olsson et al. (2021) examine multiple dimensions of user experience in the context of contactless product delivery. Among these, the sensory dimension stands out, encompassing tactile, thermal, and visual experiences that stimulate the consumer's senses. Specifically, within the visual dimension, the authors focus on the design and size of the product reception box. Their findings show that users appreciate a modern and visually appealing design in the box used to collect their parcels, indicating that well-designed packaging enhances overall user satisfaction.

According to Vrhovac et al. (2023), visual appeal reflects the importance users assign to the aesthetic design of delivery service companies, considering elements such as the appearance of the delivery vehicle, the appearance of the last-mile delivery agent, and the design of product packaging. This dimension holds relevance for last-mile delivery users because, as Cheng et al. (2021) argue, visual appeal—manifested through the perceived importance of the delivery personnel's appearance, including uniform cleanliness and the condition of the delivery container—exerts a strong and favorable effect on user satisfaction.

Conversely, Vrhovac et al. (2024) report that visual appeal exerts a statistically significant but negative influence on user satisfaction, suggesting that users who place less importance on visual aspects of the delivery process tend to experience higher satisfaction with the service. Similarly, Macías et al. (2021) find that during the COVID-19 lockdown, visual appeal—evaluated through concerns regarding the delivery agent's personal appearance and verbal interaction—generated

more favorable evaluations of the delivery service; however, its influence on user satisfaction lost statistical significance.

H3: User experience in the visual-appeal dimension exerts a positive and significant influence on final-user satisfaction with last-mile delivery services in the electronic commerce context.

Joyful Anticipation (UX4)

According to Vrhovac et al. (2023), joyful anticipation refers to the emotional state consumers experience while waiting for their orders to arrive. This emotion can be assessed through their expectations of receiving the delivery and the happiness associated with this process. In this regard, Olsson et al. (2023) note that user experience encompasses an emotional dimension shaped by moods, feelings, and affective responses. Within this emotional context, Kamis et al. (as cited in Vrhovac et al., 2024). argue that joyful anticipation—expressed through the enjoyment users feel when purchasing through digital platforms—positively and significantly influences user satisfaction, since when users feel comfortable during the purchasing process, they tend to experience emotions such as happiness, self-confidence, and curiosity.

Nevertheless, Vrhovac et al. (2024) report that joyful anticipation exerts a positive and significant impact on satisfaction because users who experience positive emotions such as joy and happiness during the waiting period evaluate the service more favorably. However, the authors also conclude that this dimension plays a less influential role compared with other factors that shape user satisfaction.

H4: User experience in the joyful-anticipation dimension exerts a positive and significant influence on final-user satisfaction with last-mile delivery services in the electronic commerce context.

Pickup contact (UX5)

Vrhovac et al. (2023) describe this variable as the smooth interaction between the user and the delivery agent at the moment of receiving a package. This aspect aligns with the findings of Olsson et al. (2023), who argue that last-mile delivery involves a social dimension that reflects users' responses to human interactions occurring throughout the delivery experience.

Their study highlights the importance of delivery personnel in shaping a positive user experience, given that throughout every stage of the digital purchasing process—from the moment the order is placed until the parcel is handed over—the delivery agent remains the only individual who interacts directly with customers (Ejdys & Gulc, 2020). In this context, Masorgo et al. (2023) point out that inappropriate or inflexible behaviors from delivery agents may provoke stronger

feelings of anger and sadness among customers, significantly reducing satisfaction and repurchase intentions.

Moreover, Cheng et al. (2021) state that pickup contact, measured through the delivery agent's experience and training, exerts a direct and statistically significant influence on user satisfaction. Similarly, Uzir et al. (2021) found that pickup contact—evaluated through accuracy, courtesy, communication, and care during delivery—positively influences user satisfaction. Vrhovac et al. (2024) also report that pickup contactexerts a positive and significant effect on user satisfaction and, notably, that this dimension generated the strongest impact among all those evaluated, underscoring its relevance within the last-mile delivery context.

H5: User experience in the pickup-contact dimension exerts a positive and significant influence on final-user satisfaction with last-mile delivery services in the electronic commerce context.

Convenience (UX6)

Convenience refers to users' belief in the usefulness and ease of purchasing online compared with traditional in-store shopping (Vrhovac et al., 2023). Convenience represents one of the predominant reasons driving consumers to opt for online purchases rather than in-person transactions, as digital purchases demand less time and effort. In particular, millennials—whose lifestyles tend to be fast-paced—seek options that simplify their daily routines and save time (Vinish et al., 2021). Within this context, home delivery emerges as an attractive solution in electronic commerce despite the environmental and logistical impacts it generates. Although more sustainable alternatives exist—such as automated lockers or pickup points—home delivery remains the preferred option due to the perceived convenience of this method (Kiba Janiak et al., 2021).

Jih notes that increasing the convenience of online services leads to higher user satisfaction (as cited in Vrhovac et al., 2024). Markowska and Marcinkowski (2022) further emphasize that home delivery significantly enhances the experience of rural consumers because of the ease it provides. Similarly, Duarte et al. (2018) concluded that convenience exerts a positive and significant impact on user satisfaction. In the same line, Vinish et al. (2021) highlight convenience—expressed through the importance users assign to the ease of placing an order—as a key driver of user satisfaction, confirming the value consumers place on the simplicity and speed of the purchasing process.

However, Vrhovac et al. (2024) conclude that although convenience positively and significantly influences overall user satisfaction with delivery services, its effect remains weaker compared with other dimensions such as interaction with the delivery agent or trust in last-mile service providers.

H6: User experience in the convenience dimension exerts a positive and significant influence on final-user satisfaction with last-mile delivery services in the electronic commerce context.

Trust in the Delivery Service (CS)

This variable refers to users' perceptions of the integrity, honesty, and capability of delivery service providers to fulfill their commitments and offer high-quality service. It encompasses both direct interactions with the service provider and users' trust in the technologies employed throughout the delivery process (Ejdys & Gulc, 2020).

Uzir et al. (2021) found that trust in the delivery service exerts a direct and positive impact on user satisfaction. They also note that trust develops through prior interactions, word of mouth, and recommendations from other customers, all of which help shape a perception of reliability. Similarly, a study conducted in China by Lai et al. (2022) confirms the positive effect of delivery-service trust on user satisfaction.

However, although Vrhovac et al. (2024) statistically confirm the positive effect of trust on satisfaction, the authors argue that this variable holds relatively less weight compared with other factors that exert stronger influence on user satisfaction. Therefore, while trust remains relevant, it does not emerge as a top-priority driver.

H7: Trust in the delivery service exerts a positive and significant influence on final-user satisfaction with last-mile delivery services in the electronic commerce context.

Satisfaction (SATIS) and Loyalty (LEAL)

Satisfaction refers to the extent to which a product's or service's performance matches or exceeds customer expectations (Kotler & Armstrong, 2020). Loyalty, in turn, describes an emotional bond between an individual and a product or service—one that drives people to repeatedly choose the same offerings provided by a company (Kotler & Keller, 2016). According to Rosenberg and Czepiel (1984), user loyalty and satisfaction remain essential for modern firms, as retaining an existing customer proves easier than acquiring a new one, given that customers constitute a limited resource.

Marketing literature recognizes that accumulated satisfactory experiences play a crucial role in transforming isolated satisfaction episodes into holistic evaluations that ultimately influence loyalty (Garbarino & Johnson, 1999; Oliver, 1999). When consumers experience a high degree of satisfaction with a product, brand, or service, they tend to exhibit positive behavioral reactions—such as repeat purchases and recommending the service to others (Suhartanto et al.,

2018). As a result, securing loyalty becomes fundamental for achieving sustained competitive advantage and maintaining long-term market share (Pal et al., 2021).

Within the ecommerce environment, recent studies show that satisfaction positively affects loyalty toward online retail websites (Mofokeng, 2021). Furthermore, research demonstrates that user satisfaction significantly and positively influences loyalty toward the providers and applications that offer home-delivery services (Pal et al., 2021; Koay et al., 2022). Thus, satisfaction emerges not only as a final outcome but also as a key antecedent for strengthening customer loyalty—especially in competitive markets where customer retention represents a critical determinant of success.

H8: Final-user satisfaction with last-mile delivery exerts a positive and significant impact on loyalty toward last-mile delivery service providers in the electronic commerce context.

Based on this, the general hypothesis was formulated as follows: User experience and trust in the delivery service significantly influence user satisfaction with last-mile delivery, which in turn significantly affects user loyalty toward last-mile delivery service providers in the electronic commerce context.

Methods

This study employed a quantitative research approach, which involves collecting numerical data to test hypotheses through measurement and statistical analysis. As Hernández et al. (2014) explain, this approach enables researchers to identify behavioral patterns and validate theories through quantification.

The study also adopts an applied orientation, as it aims to address a practical problem related to user satisfaction and loyalty in ecommerce platforms. According to Hernández et al. (2014), scientific research can pursue two fundamental purposes: generating knowledge or solving specific issues. This study contributes directly to the latter.

The research scope is correlational–causal, as it seeks to identify relationships among variables and determine how changes in one variable may influence others. Hernández et al. (2014) highlight that this type of scope makes it possible to understand the degree of connection among study variables, an essential step in identifying the factors that shape satisfaction and loyalty.

The study uses a non-experimental design because the variables remain unmanipulated; instead, their natural interactions are observed and analyzed (Hernández et al., 2014).

Structural Equation Modeling

Because the study is multivariate and includes both latent and observed variables, data processing followed a structural equation approach. According to Kline (2016), latent variables cannot be measured directly and must be inferred from observable indicators, whereas observed variables correspond to directly measurable empirical data.

The study relied on a structural equation modeling (SEM) approach due to its ability to examine interrelationships among latent variables represented by indicators (Hair et al., 2017). Partial least squares (PLS) was selected as the estimation technique because it effectively analyzes complex causal relationships among latent variables, particularly when the objective involves identifying the key factors that influence target variables (Hair et al., 2017). Unlike CB-SEM, which requires large samples and normally distributed data, PLS-SEM offers greater flexibility and works well with non-normal datasets such as those used in this study. Furthermore, PLS-SEM accommodates smaller sample sizes and demands fewer strict statistical assumptions, making it appropriate for a relatively recent research topic with limited prior literature and focused on Zones 6 and 7 of the city. SmartPLS 4 was used for data processing.

Population and Sample

The sample focuses on users of delivery applications in Metropolitan Lima, specifically Zones 6 and 7. According to Cisternas (2021), Lima accounts for 87.5% of delivery services in the country, and these particular zones have experienced a marked increase in demand for home-delivery services, largely driven by the rise of electronic commerce (República, 2022). Participants aged 18 to 35 were selected because they represent the primary users of delivery applications (Rungruangjit & Charoenpornpanichkul, 2024). Similarly, the CCL identifies this age group as the most active in using digital platforms (as cited in Forbes Perú, 2023). Sáenz (2023) reports that 36.5% of online buyers in Peru are between 25 and 35 years old and 18.3% are between 18 and 24, meaning that 54.8% of online buyers fall within this segment—highlighting its relevance for ecommerce. García (2023) adds that socioeconomic levels A and B possess greater purchasing power, which facilitates broader use of delivery and online shopping services.

The unit of analysis is an individual aged 18 to 35, belonging to socioeconomic level A or B, residing in a district within Zones 6 and 7 of Lima—such as San Miguel, Lince, Miraflores, or Surco—who in 2025 has purchased perishable and/or non-perishable products online using delivery applications such as Rappi, Pedidos Ya, Didi Food, or others, and who has received orders at home.

Sample Size

To determine the sample size, the target population was first identified. According to the Compañía Peruana de Estudios de Mercado y Opinión Pública (CPI, 2023), Lima has 11,124,000

inhabitants. Based on APEIM (2020) data, the proportion of individuals from socioeconomic levels A and B aged 18 to 35 residing in Zones 6 and 7 was estimated. Considering that 44% of this population makes online purchases (IPSOS, 2020), the number of individuals meeting the criteria reached 103,225 in 2024. Applying a 1% annual population growth projection (INEI, 2024), the estimated population for 2025 reached 105,304 individuals.

Using this population estimate of 105,304, and applying the formula for finite populations with a 95% confidence level (z = 1.96), a 5% margin of error, and an expected proportion of 50%, a sample size of 383 individuals was calculated. Although authors such as Hoyle (2012) suggest that samples of 100–200 cases suffice for PLS-SEM, a larger sample was selected to improve precision and representativeness. This decision aligns with Wong (2013), who notes that larger samples reduce bias in moderately complex models.

A non-probabilistic convenience sampling method was used, selecting participants based on accessibility and willingness to participate (Hernández et al., 2014). Data collection took place through digital platforms—such as email and social media—allowing rapid access to potential respondents. However, because of the sampling method, the findings cannot be generalized to the entire population and should be interpreted as an approximation of the behavior of a specific segment.

Data Collection Instrument

The data collection technique was a survey administered through a self-administered questionnaire. The items were adapted from previously validated instruments. Because the original instruments were developed in English, translation was required to ensure comprehension among respondents. The pilot questionnaire included 39 questions, 33 of which assessed the study variables. A first pilot test with 9 participants evaluated item clarity and scale comprehension, generating feedback on redundancies or unfamiliar terms. After the necessary adjustments, a second pilot test was conducted with 72 participants using Google Forms. The next section explains the analysis of the measurement instrument applied to this second pilot sample.

Analysis of Measurement Instruments

The first step involved evaluating the consistency of the measurement instrument, which helps determine whether relationships exist among the constructs. For this purpose, Cronbach's alpha (α) was used, and its value should reach at least 0.70 (Lacave et al., 2015).

The α value corresponding to 30 items—after removing four items (P1, P4, P16, and P17) during the confirmatory factor analysis—reached 0.899, which indicates an acceptable level of reliability (Lacave et al., 2015).

Additionally, the dimensions of the user experience variable obtained Cronbach's alpha values equal to or above 0.70. It is noteworthy that the efficiency dimension reached a value of 0.70 after removing items 1 and 4, and the convenience dimension also reached 0.70 after removing

item 17. Likewise, the variables delivery-service trust, user satisfaction, and user loyalty reported α values above 0.70, demonstrating internal consistency among their respective items.

Table 1. Reliability Results

Dimension	**Cronbach's α**
UX1	0.70
UX2	0.72
UX3	0.70
UX4	0.73
UX5	0.70
UX6	0.70
CS	0.90
SATIS	0.89
LEAL	0.91

Source: Own elaboration

Subsequently, an Exploratory Factor Analysis (EFA) was conducted to determine whether the elements of the measurement instrument adequately represent and align with the phenomenon under study (Mavrou, 2015). For this purpose, the Kaiser–Meyer–Olkin (KMO) measure must exceed 0.60 (Kaiser et al., 1974), and Bartlett's Test of Sphericity must show a significance level below 0.05, as both indicators validate the suitability of performing factor analysis (Lacave et al., 2015).

In this study, after removing four items during the confirmatory factor analysis, the KMO value reached 0.755, and the significance level of Bartlett's test was below 0.001. These results indicate optimal conditions for conducting factor analysis. Only statements with factor loadings equal to or greater than 0.25 were retained. Following the exploratory factor analysis, the model remained composed of the "user experience" variable with its six previously defined dimensions, while the variables trust in the delivery process, user satisfaction, and user loyalty were preserved.

Table 2. Factor Loadings

Ítems	UX1	UX2	UX3	UX4	UX5	UX6	CS	SATIS	LEAL
P2	0.737								
P3	0.603								
P5		0.694							
P6		0.850							
P7		0.427							
P8			0.805						
P9			0.435						
P10			0.724						
P11				0.600					
P12				0.915					
P13				0.271					
P14					0.746				
P15					0.356				
P18						0.533			
P19						0.502			
P20							0.383		
P21							0.576		
P22							0.864		
P23							0.709		
P24							0.833		
P25							0.298		
P26								0.258	
P27								0.782	
P28								0.497	
P29									0.723
P30									0.500
P31									0.925
P32									0.703
P33									0.561
P34									0.359

Source: Own elaboration

Subsequently, a Confirmatory Factor Analysis (CFA) was conducted to evaluate the adequacy of a previously established theoretical model, assessing the extent to which the observed variables cluster into latent factors or constructs (Hair et al., 2019).

The CFA KMO test yielded a value of 0.755, which indicates acceptable conditions for conducting the analysis (Kaiser et al., 1974). Moreover, the R^2 values reflect the proportion of variance in each observed variable that the model explains through its latent factors; thus, values closer to one are preferred (Hair et al., 2019). The table below presents the corresponding values and shows that, in every case, the items associated with each latent variable explain more than 40% of the construct they intend to measure.

Table 3. R^2 for Latent Variables

Latent Variable	**R^2**
UX1	0.520
UX2	0.555
UX3	0.459
UX4	0.495
UX5	0.566

Latent Variable	**R^2**
UX6	0.621
CS	0.616
SATIS	0.741
LEAL	0.666

Source: Own elaboration

The validated items aim to measure the aspects detailed in the table below.

Table 4. Operationalization

Latent Variable	Observable Variable
UX1 – Efficiency	UX1.1 User tolerance level toward failed deliveries. UX1.2 User-perceived importance of correct packaging.
UX2 – Parcel Tracking	UX2.1 User interest in knowing the location of the package. UX2.2 User involvement in parcel tracking. UX2.3 User perception of the usefulness of tracking alerts and notifications.
UX3 – Visual Appeal	UX3.1 User-perceived importance of delivery personnel appearance. UX3.2 User-perceived importance of package presentation. UX3.3 User-perceived importance of delivery vehicle appearance.
UX4 – Joyful Anticipation	UX4.1 User anticipation regarding the arrival of the package. UX4.2 Positive anticipation experienced before receiving the delivery. UX4.3 Emotional enjoyment associated with waiting for the order.
UX5 – Pickup contact	UX5.1 Perceived ease of the delivery process. UX5.2 Perceived clarity of interaction with the delivery agent.
UX6 – Convenience	UX6.1 Perceived convenience of home delivery as part of the online shopping process. UX6.2 Degree of convenience associated with receiving home-delivered products.
CS – Trust in the Delivery Service	CS1 Perception of the company's reliability in home-delivery services. CS2 Perceived confidence in the safety of home-delivered products. CS3 Perceived fulfillment of promises by the delivery company. CS4 Perception of transparency in the delivery process. CS5 Perceived ability of delivery-service companies to meet user needs.
SATIS – User Satisfaction	SATIS 1 Satisfaction with delivery results. SATIS 2 Satisfaction with the overall delivery experience. SATIS 3 General satisfaction with the home-delivery service.
LEAL – User Loyalty	LEAL 1 Willingness to speak positively about home-delivery service companies. LEAL 2 Willingness to recommend home-delivery services. LEAL 3 Intention to continue using delivery-service companies. LEAL 4 Level of enjoyment associated with receiving purchased products. LEAL 5 Level of retention. LEAL 6 Probability of repeating the use of the service.

Source: Own elaboration

After the validation process, the final questionnaire administered to the sample consisted of 35 questions, of which 30 measured the study variables and 5 served as screening questions.

Table 5. Final Questionnaire

Latent Variable	Observable Variable	Items
UX1 – Efficiency	UX1.1	1. I change delivery companies if home deliveries are performed poorly.
	UX1.2	2. I appreciate when the products I receive arrive correctly packaged.
UX2 – Parcel Tracking	UX2.1	3. I consider it important to have the option to check the location and status of the package I ordered.
	UX2.2	4. I enjoy monitoring the delivery status of the package I ordered.
	UX2.3	5. I consider tracking notifications helpful during the delivery process of my order.
UX3 – Visual Appeal	UX3.1	6. The appearance of the delivery personnel matters to me.
	UX3.2	7. The presentation of the package at the moment of delivery matters to me.
	UX3.3	8. The appearance of the delivery vehicle during the package drop-off matters to me.
UX4 – Joyful Anticipation	UX4.1	9. I enjoy knowing how soon the products I ordered will arrive.
	UX4.2	10. I feel excited when I know my ordered items are arriving soon.
	UX4.3	11. I feel happy when I finally collect the package I ordered.
UX5 – Pickup-Contact	UX5.1	12. I perceive the delivery process as simple.
	UX5.2	13. The interaction with the delivery agent when receiving the package feels like a positive experience.
UX6 – Convenience	UX6.1	14. I consider home delivery a convenient alternative compared to in-store shopping.
	UX6.2	15. I feel that home delivery requires less effort than picking up products myself at a physical store.
CS – Trust in the Delivery Service	CS1	16. I trust home-delivery companies because I believe they act honestly.
	CS2	17. I trust home-delivery companies because I believe they use reliable technology.
	CS3	18. I believe delivery service companies fulfill what they promise.
	CS4	19. I feel confident using services offered by home-delivery companies.
	CS5	20. I believe delivery-service companies genuinely care about their users.
	CS6	21. I plan to continue using home-delivery services because they build trust.
SATIS – User Satisfaction	SATIS1	22. I feel satisfied with the results of my home-delivery orders.
	SATIS2	23. I feel that the home-delivery services I use frequently meet my expectations.
	SATIS3	24. I feel satisfied with the overall home-delivery service provided by the company I use regularly.
LEAL – User Loyalty	LEAL1	25. I speak positively about the home-delivery service companies I use frequently.
	LEAL2	26. I recommend home-delivery companies to my friends or family.
	LEAL3	27. I intend to continue using the home-delivery companies I use most often.
	LEAL4	28. I enjoy the experience of receiving the products I purchase.
	LEAL5	29. I prefer making purchases through the home-delivery company I use most often instead of switching to another provider.
	LEAL6	30. I intend to continue using the services of the home-delivery company I use frequently.

Note. UX1–UX6 items are adapted from Vrhovac et al. (2023); CS items are adapted from Vrhovac et al. (2024); SATIS items are adapted from Lai et al. (2021); and LEAL items are adapted from Pal et al. (2021).

Results

Data was collected between April 15 and May 1, 2025. The questionnaire was distributed to 3,389 individuals through digital channels, yielding 506 responses, which corresponds to a response rate of 14.9%. After applying the screening criteria, a total of 387 valid responses remained for analysis.

The sample consisted primarily of women (55.3%). Regarding age, only adults were included, with the 18–23 age group representing the largest segment at 64.34%. This overrepresentation of respondents aged 18 to 23 does not proportionally reflect the age distribution of the target population and may influence the interpretation of the findings. In terms of residence, most respondents lived in Zone 7, accounting for 66.15% of the sample.

Table 6. Respondent Profile

Variable	Scale	Frequency	Percentage
Gender	Female	214	55.30%
	Male	173	44.70%
Age (years)	18–23 years	249	64.34%
	24–29 years	78	20.16%
	30–35 years	60	15.50%
Area of residence	Zone 7	256	66.15%
	Zone 6	131	33.85%

Source: Own elaboration

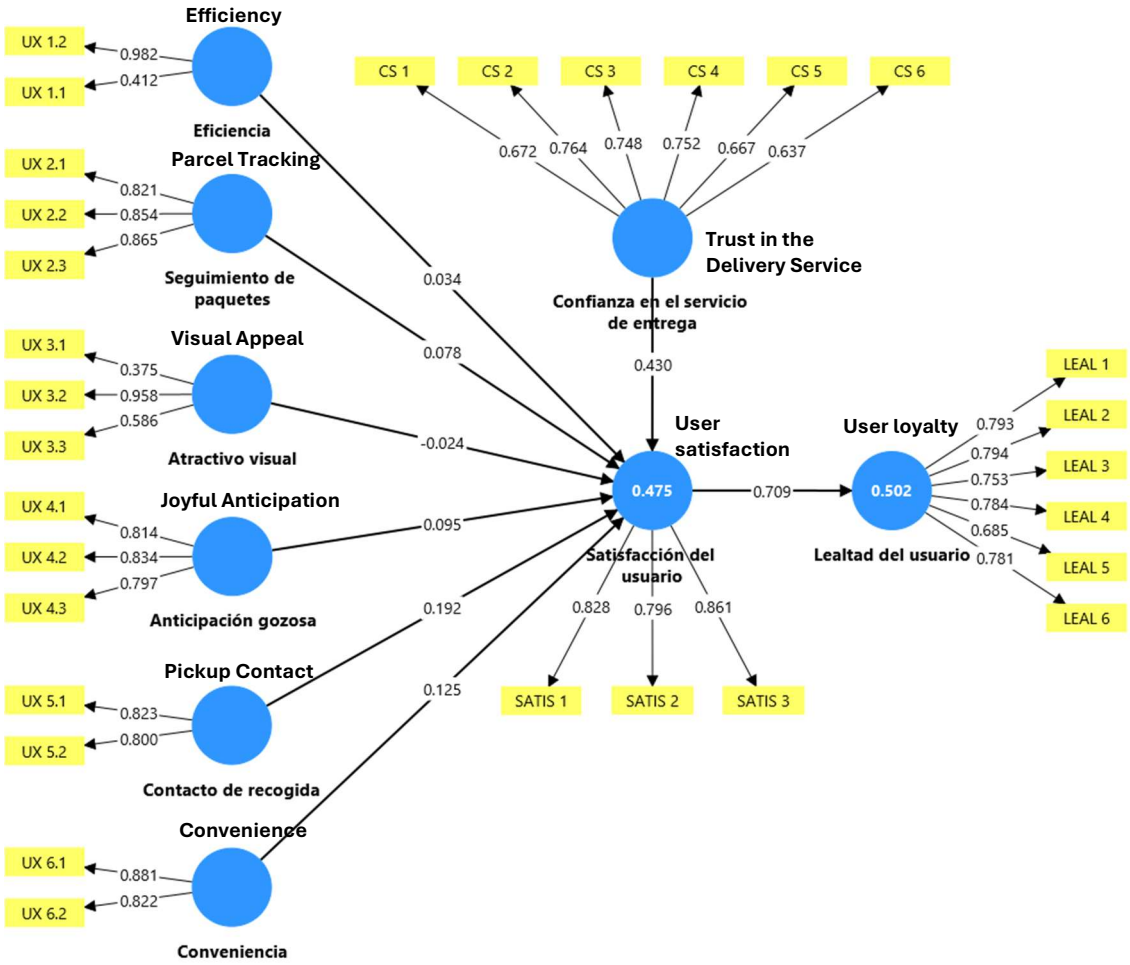
The data collected were processed and analyzed using the SmartPLS 4 platform. The items corresponding to each variable were coded according to their respective indicators, and a structural equation model was developed through multivariate analysis.

It is essential to evaluate the measurement model through global model fit. For this purpose, the Standardized Root Mean Square Residual (SRMR) was used—an absolute fit index that reflects the standardized difference between the observed correlations and those predicted by the model (Henseler et al., 2016). In this study, the SRMR value reached 0.071, which indicates a good model fit, as it falls below the recommended threshold of 0.08 (Henseler et al., 2016).

To assess internal consistency, Cronbach's alpha was initially examined. Although this metric typically requires values of 0.70 or higher to ensure acceptable internal reliability (Lacave et al., 2015), some dimensions in this study yielded lower values—namely efficiency (0.377), visual appeal (0.663), pickup contact (0.483), and convenience (0.626).

However, because the model was estimated using PLS-SEM, Hair et al. (2017) recommend prioritizing Composite Reliability (CR), a more suitable and robust measure that does not assume equal indicator loadings and performs well with scales containing few items. In line with this, all CR values met or exceeded the minimum threshold of 0.70 (Hair et al., 2017), allowing us to confirm adequate internal consistency across all dimensions.

Figure 1. Proposed Model



Source: Own elaboration

Regarding convergent validity, the Average Variance Extracted (AVE) was examined. This metric, recommended by Fornell and Larcker (1981), evaluates whether the indicators of each construct share a sufficient amount of common variance. An AVE value of 0.50 or higher indicates that the construct explains at least 50% of the variance of its indicators, thus supporting convergent validity. In this study, all dimensions met or surpassed this criterion, demonstrating satisfactory convergent validity within the model.

Table 7. Model Fit

	Cronbach (α)	CR	AVE
UX1	0.377	0.700	0.567
UX2	0.803	0.884	0.717
UX3	0.663	0.700	0.500
UX4	0.749	0.856	0.664
UX5	0.483	0.794	0.659
UX6	0.626	0.841	0.726
CS	0.800	0.857	0.502
SATIS	0.771	0.868	0.687
LEAL	0.859	0.895	0.587

Source: Own elaboration

As part of the measurement model assessment, collinearity among indicators was examined using the Variance Inflation Factor (VIF). According to Hair et al. (2017), this indicator helps identify potential multicollinearity issues that may distort factor loadings and the amount of explained variance. Furthermore, Kock and Lynn (2012) recommend that, within the context of PLS-SEM, VIF values remain below 3.3 to ensure the absence of significant collinearity among indicators. In this study, the results show that the average VIF values across all items within each dimension range between 1.057 and 1.824—well within the acceptable thresholds—indicating no problematic collinearity among the model's dimensions.

Table 8. Collinearity Statistics

	VIF
UX1	1.057
UX2	1.734
UX3	1.403
UX4	1.506
UX5	1.113
UX 6	1.262
CS	1.559
SATIS	1.629
LEAL	1.824

Source: Own elaboration

Discriminant validity was assessed using the Heterotrait–Monotrait ratio (HTMT), a more accurate measure than the traditional Fornell–Larcker criterion (Henseler et al., 2014). This index compares the correlations between items of different constructs with the correlations among items within the same construct. According to Henseler et al. (2014), HTMT values below 0.90

indicate adequate discriminant validity. As shown in the table below, all HTMT coefficients fall below the 0.90 threshold, confirming that the constructs in the model remain conceptually distinct.

Table 9. Discriminant Validity

	Joyful Anticipation	Visual Appeal	Trust in Delivery Service	Pickup Contact	Convenience	Efficiency	User Loyalty	User Satisfaction	Parcel Tracking
Joyful Anticipation	—	0.332	0.301	0.624	0.524	0.594	0.481	0.467	0.582
Visual Appeal		—	0.264	0.418	0.271	0.379	0.157	0.224	0.384
Trust in Delivery Service			—	0.625	0.526	0.319	0.706	0.758	0.342
Pickup Contact				—	0.797	0.605	0.754	0.795	0.687
Convenience					—	0.569	0.636	0.637	0.568
Efficiency						—	0.443	0.421	0.836
User Loyalty							—	0.869	0.395
User Satisfaction								—	0.482

Source: Own elaboration

As part of the structural model evaluation, the R^2 and adjusted R^2 values were examined. According to Cohen (1988), coefficients ranging from 0.30 to 0.50 indicate a moderate level of explanatory power, whereas values above 0.50 reflect substantial explanatory strength. The table below presents the corresponding coefficients.

On one hand, the R^2 value indicates the extent to which the independent variables influence the variance of the dependent variable (Cohen et al., 2003; Hair et al., 2019). In this study, user satisfaction explains 50.2% of the variance in user loyalty, which represents a substantial proportion (Cohen, 1988). Meanwhile, user experience and trust in the delivery service jointly account for 47.5% of the variance in user satisfaction, indicating a moderate level of explanatory power (Cohen, 1988).

On the other hand, the adjusted R^2 corrects the standard R^2 by penalizing the inclusion of predictors that do not contribute meaningfully to the model. This metric becomes particularly relevant when multiple predictors are involved, as standard R^2 tends to increase with each additional variable—even when the new predictor adds little explanatory value (Hair et al., 2019). In this study, the adjusted R^2 values closely align with the original R^2 coefficients: 0.501 for user loyalty and 0.465 for user satisfaction. This similarity indicates that the predictors included in the model possess strong explanatory capacity without evidence of overfitting.

Table 10. R^2

Variable	R-squared	Adjusted R-squared
LEAL (User Loyalty)	0.502	0.501
SATIS (User Satisfaction)	0.475	0.465

Source: Own elaboration

In addition to assessing the model's explanatory power, its predictive capability was examined using the Q^2 coefficient (Shmueli et al., 2016). The results show that the Q^2 value for user satisfaction reached 0.450, while the Q^2 value for user loyalty reached 0.424. Since both values exceed zero, the model demonstrates predictive relevance for each of the dependent variables (Henseler et al., 2009).

Table 11. Q^2

	Q^2
LEAL	0.424
SATIS	0.450

Source: Own elaboration

To complement the model assessment, the effect size coefficient F^2 was examined. This statistic evaluates the magnitude of the influence that each independent variable exerts on the dependent variable within the proposed model (Cohen, 1988).

Cohen establishes that an F^2 value equal to or greater than 0.02 reflects a small effect, values equal to or above 0.15 indicate a medium effect, and values equal to or above 0.35 denote a large effect.

Regarding trust in the delivery service, the F^2 value reached 0.277. According to Cohen's (1988) criteria, this represents a medium effect, indicating that this predictor meaningfully enhances the model's explanatory power for user satisfaction. The dimensions pickup contact and convenience obtained F^2 values of 0.046 and 0.02, respectively, which correspond to small effects on user satisfaction.

In contrast, joyful anticipation, visual appeal, efficiency, and parcel tracking yielded F^2 values of 0.012, 0.001, 0.001, and 0.006, respectively. These values fall below the threshold for small effects and therefore reflect negligible influence on user satisfaction (Cohen, 1988), suggesting that their contribution to explaining satisfaction remains highly limited.

Finally, the relationship between user satisfaction and user loyalty produced an F^2 value of 1.009, which exceeds Cohen's (1988) threshold for a large effect. This finding supports Oliver's (1999) theoretical proposition that satisfaction functions as a strong antecedent of user loyalty.

Table 12. F^2

Relationship	**F^2**
Joyful Anticipation → User Satisfaction	0.012
Visual Appeal → User Satisfaction	0.001
Trust in Delivery Service → User Satisfaction	0.277
Pickup Contact → User Satisfaction	0.046
Convenience → User Satisfaction	0.020
Efficiency → User Satisfaction	0.001
User Satisfaction → User Loyalty	1.009
Parcel Tracking → User Satisfaction	0.006

Source: Own elaboration

The regression coefficients and their statistical significance were also examined. According to Gede (2024), a *t*-value above 1.96 and a *p*-value below 0.05 indicate a significant influence between the variables under study. The direction of the effect depends on the path coefficient (β), which may reflect either a positive or negative relationship (Gede, 2024).

For the relationship between efficiency and user satisfaction, the *t*-value reached 0.744 and the *p*-value 0.457, which shows the absence of a statistically significant relationship. However, the β coefficient reached 0.034; although positive, the effect remains weak because it does not exceed the 0.10 threshold (Hair et al., 2017). Based on this, the first hypothesis is partially supported: efficiency exerts a positive influence on user satisfaction, yet the lack of statistical significance indicates that the observed effect may have occurred by chance.

Regarding parcel tracking and user satisfaction, the results yielded a *t*-value of 1.516, a *p*-value of 0.130, and a β of 0.078. These values indicate a positive but weak relationship, as the coefficient does not surpass the 0.10 threshold (Hair et al., 2017). Furthermore, the relationship does not achieve statistical significance because the values fail to meet the minimum criteria of $t > 1.96$ and $p < 0.05$ (Gede, 2024). Consequently, the second hypothesis is partially supported: the direction of the effect is positive, but the evidence remains insufficient to rule out the possibility that the relationship occurred by chance (Creswell J. & Creswell D., 2018).

For visual appeal and user satisfaction, the β coefficient reached −0.024, indicating an inverse relationship (Gede, 2024). The effect remains weak because it falls below the 0.10 threshold (Hair et al., 2017). The results show that when users place less importance on visual appeal, their satisfaction tends to increase. However, similar to the previous relationships, this effect lacks statistical significance ($t = 0.538$; $p = 0.591$), placing it outside the acceptable bounds for statistical significance (Gede, 2024). Based on this, the third hypothesis is rejected, as the negative and non-significant effect could easily result from random variation (Creswell J. & Creswell D., 2018).

For joyful anticipation and user satisfaction, the analysis produced a *t*-value of 2.144 and a *p*-value of 0.032, indicating a statistically significant relationship with less than a 5% probability of being due to chance (Gede, 2024). The β coefficient of 0.095 suggests a positive but weak effect,

as it remains below 0.10 (Hair et al., 2017). These findings imply that greater positive anticipation before receiving an order correlates with higher satisfaction. Therefore, the fourth hypothesis is supported.

Likewise, the relationship between pickup contact and satisfaction shows a *t*-value of 3.986 and a *p*-value of 0.000, both surpassing the thresholds required to confirm statistical significance (Gede, 2024). According to Fisher (1934), a very low *p*-value indicates that the result is highly unlikely to arise from chance. The β coefficient reached 0.192, reflecting a positive and moderate effect because it exceeds 0.10 but remains below 0.30 (Hair et al., 2017). Therefore, the fifth hypothesis is supported.

For convenience, the β coefficient reached 0.125, indicating a positive and moderate relationship with user satisfaction, as it falls between 0.10 and 0.30 (Hair et al., 2017). This effect achieved statistical significance, reflected in a *t*-value of 2.575 and a *p*-value of 0.01 (Gede, 2024). Therefore, the sixth hypothesis is supported.

Trust in the delivery service produced a β coefficient of 0.430, indicating a strong positive effect on user satisfaction, as the value surpasses 0.30 (Hair et al., 2017). The *t*-value reached 9.682 and the *p*-value 0.0; because both values exceed the thresholds proposed by Gede (2024), the effect is statistically significant. Fisher (1934) also notes that extremely low *p*-values imply that the result is highly unlikely to arise by chance. These findings support the corresponding hypothesis: greater trust in delivery providers leads to higher user satisfaction.

Furthermore, user satisfaction exerted a strong and positive influence on user loyalty, with a β coefficient of 0.709—well above the 0.30 threshold (Hair et al., 2017). The *t*-value reached 19.068 and the *p*-value 0.0, exceeding the significance standards established by Gede (2024). These results support the eighth hypothesis.

Overall, the PLS-SEM results partially support the general hypothesis. The analysis identified a significant influence of trust in the delivery service on user satisfaction. However, only specific dimensions of user experience—pickup contact, convenience, and joyful anticipation—demonstrated significant effects on satisfaction. This indicates that not all components of the user experience contribute equally to satisfaction. Additionally, user satisfaction exerts a strong and statistically significant effect on user loyalty.

Tabla 13. β, Value t & p

Proposed Relationship	**Coefficient β (Path)**	**t-value**	**p-value**	**Accept Hypothesis?**
Efficiency → User satisfaction	0.034	0.744	0.457	Partial
Parcel-tracking → User satisfaction	0.078	1.516	0.130	Partial
Visual appeal → User satisfaction	–0.024	0.538	0.591	No
Joyful anticipation → User satisfaction	0.095	2.144	0.032	Yes
Pickup contact → User satisfaction	0.192	3.986	0.000	Yes
Convenience → User satisfaction	0.125	2.575	0.010	Yes
Trust in delivery service → User satisfaction	0.430	9.682	0.000	Yes
User satisfaction → User loyalty	0.709	19.068	0.000	Yes

Source: Own elaboration

Discussion

The findings partially support H1, as the relationship between efficiency and user satisfaction is positive but weak and not statistically significant. This result partially aligns with previous studies indicating that efficiency—understood as professionalism and delivery accuracy—has a positive and significant effect on user satisfaction (Lai et al., 2022; Shrinivas & Shafighi, 2022). However, the results from the Lima context show a weak relationship between efficiency and satisfaction ($\beta = 0.034$), contrasting with the findings of Vrhovac et al. (2024), who reported a moderate effect ($\beta = 0.286$). This discrepancy may be explained by different levels of e-commerce maturity: while the European market is more consolidated, with consumers who value precision in delivery operations, the Peruvian market remains emerging and less competitive, which may lead users to adjust expectations and prioritize other attributes.

H2 is also partially supported, as the relationship between parcel-tracking and satisfaction is positive but weak and non-significant. This result partially agrees with prior studies reporting a positive and significant effect (De Souza et al., 2022; Kawa & Swiatowiec-Szczepańska, 2021; Nguyen et al., 2016; Cheng et al., 2021). Likewise, the results fully match those of Vrhovac et al. (2024), who also found a positive, weak, and non-significant effect ($\beta = 0.041$).

However, the slightly higher coefficient observed in Lima ($\beta = 0.078$) suggests that local consumers may place greater value on attributes related to trust and security, as real-time tracking provides them with a greater sense of control and oversight during the delivery process.

H3 is rejected, as visual appeal does not exert a positive or significant influence on user satisfaction. These findings partially align with Macías et al. (2021) in Ecuador, who concluded that although the appearance and verbal interaction of couriers can generate favorable evaluations, their effect on satisfaction is not significant. Similarly, the results partially align with Vrhovac et al. (2024), who found a moderate, negative, and significant association ($\beta = -0.167$), whereas the Lima sample shows a weak, negative, and non-significant relationship ($\beta = -0.024$).

This suggests that users who place little importance on aesthetic elements tend to report higher satisfaction. Such patterns imply that consumers in Lima value functional attributes over visual design, which is consistent with the characteristics of an emerging digital services market.

H4 is supported, as joyful anticipation has a positive and significant effect on satisfaction. These findings align with Kamis et al. (2010), who argued that joyful anticipation positively affects satisfaction because users experience positive emotions during the purchase process (cited in Vrhovac et al., 2024). Similarly, Vrhovac et al. (2024) reported a positive, significant, and moderate relationship ($\beta = 0.237$), although in the Lima context the effect is weak ($\beta = 0.095$).

This difference may be attributed to the prioritization of functional over emotional attributes in emerging markets, whereas in more mature markets, reliable delivery processes allow anticipation to become a stronger emotional driver.

H5 is supported, as pickup contact positively and significantly affects satisfaction. This aligns with Cheng et al. (2021) and Uzir et al. (2021), who concluded that attributes such as the courier's friendliness, communication, and experience positively and significantly influence satisfaction.

This is reasonable given that delivery personnel are the only actors who interact directly with customers throughout the entire digital purchase process (Ejdys & Gulc, 2020). However, the relative influence differs across contexts: in Lima, pickup contact has a moderate impact (β = 0.192), whereas in Serbia it has a strong impact (β = 0.676). This discrepancy may be due to differences in the structure of last-mile operations: in Serbia, courier interaction is embedded in more structured service experiences, whereas in Lima the operations are more functional than experiential. As a result, security and reliability are prioritized over interpersonal interaction.

H6 is supported, as convenience positively and significantly affects satisfaction. This confirms consumers' appreciation for simplicity and efficiency in the purchasing process, consistent with Duarte et al. (2018) and Vinish et al. (2021). While Vrhovac et al. (2024) also found a positive association, the magnitude differs: in Serbia the effect is strong (β = 0.363), whereas in Lima it is moderate (β = 0.125). According to Vrhovac et al. (2024), users often view convenience as an intrinsic characteristic of home delivery. However, in Lima—where e-commerce is still consolidating—consumers prioritize trust and security over convenience, which explains the lower relative impact.

H7 is supported, as trust in the delivery service positively and significantly affects satisfaction. These findings align with Uzir et al. (2021) and Lai et al. (2022). However, Vrhovac et al. (2024) found that trust had a weaker effect relative to other UX dimensions (β = 0.504), whereas in the present study trust is the strongest predictor of satisfaction (β = 0.430). This reflects the characteristics of the Lima market, where trust remains central in the adoption of digital services. Consumers value price transparency, safety when receiving deliveries, and payment-upon-delivery options (García, 2025), which reinforces trust as a key determinant of satisfaction.

Finally, H8 is supported, as user satisfaction positively and significantly influences loyalty. These findings align with Mofokeng (2021), Pal et al. (2021), and Koay et al. (2022). Notably, Pal et al. (2021) reported a strong effect (β = 0.586), but the present study shows an even stronger influence (β = 0.709), indicating that satisfaction is one of the most important antecedents of loyalty in this context. This heightened effect may be explained by the dominant role of trust: since trust strongly influences satisfaction, users who perceive higher trust levels also experience stronger satisfaction, which in turn drives loyalty, as they prefer to repeatedly purchase from reliable providers rather than explore alternatives.

Conclusions

The study identifies trust in the delivery service as the factor exerting the strongest influence on user satisfaction. Regarding user experience, both emotional and functional dimensions—namely joyful anticipation, pickup contact, and convenience—emerged as significant contributors. Moreover, satisfaction operates as a central mechanism that strengthens users' loyalty toward service providers.

User experience in the efficiency dimension does not exert a significant effect on satisfaction. Although participants recognize efficiency as an essential service attribute, the findings reveal that its contribution does not meaningfully enhance satisfaction. Its absence, however, may generate dissatisfaction. This pattern suggests that users treat efficiency as a basic expectation rather than a source of differentiation within last-mile delivery services.

Parcel tracking functionalities show no significant relationship with satisfaction. While users appreciate the ability to monitor their orders, tracking tends to function as a standard feature rather than a distinguishing element of service quality.

Visual appeal—reflected in the appearance of couriers, delivery vehicles, and packaging—did not meaningfully enhance satisfaction and even displayed a negative effect. This outcome suggests that users assign limited relevance to aesthetic aspects and that lower emphasis on such attributes may coincide with higher satisfaction. The evidence indicates that users prioritize functional and emotional drivers—such as speed and convenience—over visual design elements. Although visual presentation may strengthen brand image, it did not meaningfully shape user satisfaction in this study.

Joyful anticipation produced a positive and significant effect on satisfaction, underscoring the role of emotional factors in shaping the user experience. When users feel excitement about receiving a purchase, the waiting period contributes to their overall enjoyment and elevates their evaluation of the service, turning emotional engagement into a relevant differentiating mechanism.

Pickup contact emerged as the user-experience dimension with the strongest influence on satisfaction. Beyond timely and proper product delivery, communication quality, courtesy, and the courier's disposition substantially shape user evaluations. In e-commerce environments where many processes unfold automatically, this brief human encounter becomes a key element for closing the purchasing experience positively.

Convenience positively and significantly affects user satisfaction. As users perceive greater ease throughout the purchasing process, their satisfaction with delivery services increases, largely because such services help reduce time and effort. Nevertheless, convenience alone does not fully define the experience; emotional elements such as joyful anticipation and interpersonal elements such as pickup contact complement and enrich the overall evaluation.

Trust in the delivery service stands as the variable with the strongest and most statistically significant effect on user satisfaction. Higher perceptions of reliability translate into higher satisfaction. Users value providers who convey security through transparent information, effective problem resolution, and dependable technological systems, all of which reinforce peace of mind and overall satisfaction.

Finally, user satisfaction exerts a positive and substantial influence on loyalty toward the delivery service. This finding indicates that satisfied users display higher probabilities of returning to the service, recommending it, and preferring it over competing alternatives. Satisfaction therefore functions not only as a measure of a specific experience but also as a critical antecedent of customer loyalty.

Recommendations

Regarding efficiency, because users perceive it as a minimum requirement, companies should preserve it as a service standard by continually monitoring indicators such as average delivery

time, punctuality, and order fulfillment. Sustaining these metrics at optimal levels allows firms to prevent service failures that could immediately trigger dissatisfaction.

With respect to parcel tracking, companies should retain it as a basic service feature and design tools that deliver essential information—estimated delivery time, courier name, and real-time location—without overwhelming users with unnecessary data. Clear and concise tracking enhances transparency while preventing cognitive overload.

Concerning visual appeal, companies should attend to specific elements that shape users' initial impressions. Ensuring that packages arrive clean, couriers maintain a tidy and professional appearance, and delivery boxes remain in good condition contribute to a coherent and trustworthy brand image, even if these attributes do not directly elevate satisfaction levels.

For joyful anticipation, companies should introduce strategies that amplify positive emotions during the waiting period. Personalized notifications or small rewards that create a sense of expectation can strengthen the emotional connection with the service. Likewise, package-tracking interfaces could include brief messages that reinforce the excitement of an approaching delivery rather than simply reporting location updates.

Given the relevance of pickup contact, companies should invest in soft-skills training for couriers, emphasizing communication, courtesy, and problem-solving abilities. High-quality interpersonal interactions during pickup contact enrich the overall user experience and improve satisfaction at the final stage of delivery.

To enhance perceived convenience, companies should expand flexible delivery-coordination options, such as selectable time windows or preferred delivery slots. Allowing users to adapt the service to their personal schedules contributes to smoother and more efficient delivery experiences.

Strengthening user trust in the delivery service requires transparent and honest communication throughout the purchasing process. Clear information on return policies, service conditions, and delivery procedures reduces uncertainty and promotes confident decision-making. Additionally, companies should reinforce the security of their technological systems to protect personal data and ensure safe transactions, which users value strongly in digital purchasing environments.

Finally, to sustain user loyalty through satisfaction, companies should implement loyalty programs that reward continued preference and stimulate positive word-of-mouth. Benefits such as discounts, free deliveries, or personalized rewards can reinforce long-term engagement and encourage repeat use of the service.

Limitations and future research directions

This study contains several limitations. First, the sample focused exclusively on Sectors 6 and 7 of Metropolitan Lima—areas characterized by higher levels of digital access and more favorable logistical conditions. Consequently, the findings do not necessarily reflect the experiences of users residing in districts with different realities. Additionally, the use of non-probabilistic convenience sampling restricts the extent to which the results can be generalized to the broader

population. Finally, the cross-sectional design captured information at a single point in time, which prevented an assessment of how perceptions might evolve over longer periods.

These limitations open several pathways for future research. Expanding the geographical scope to include users from districts with diverse socioeconomic levels and logistical conditions would strengthen external validity. Employing probabilistic sampling in subsequent studies would also allow researchers to generalize findings more confidently.

Moreover, longitudinal designs could track how trust, satisfaction, and loyalty shift as electronic commerce continues to advance in the country. Future studies may also examine whether relationships among variables differ according to user profiles—such as age group, socioeconomic status, or frequency of service use—through invariance testing or multi-group analysis.

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