

Adoption of Delivery Applications in Bolivia: An Extended UTAUT2 Perspective

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Abstract

Digital platforms and appliances shaped the modern delivery services and last-mile logistics worldwide. Today, logistics and operational strategies are focused on the new consumer behaviors in both developed and emerging markets. In this landscape, delivery apps play a crucial role in enhancing firms' competitiveness, customer responsiveness, and optimized resource allocation. Nevertheless, adoption patterns in emerging economies remain largely unexplored. That is why this study examines the determinants of the intention to use delivery applications in Bolivia through an extended UTAUT2 model that incorporates perceptions of artificial intelligence, legality, gamification, and social influence. Using a structured survey, data were collected from 403 users and analyzed using

multiple linear regression. The results show that facilitating conditions are the highest predictor of intention and actual use behavior, confirming the critical importance of digital infrastructure, reliable connectivity, and secure payment systems in technology adoption. Additionally, the perception of artificial intelligence, legality, and social influence has a significant and positive effect on intention, while habit influences intention but is not reflected in actual use behavior. On the other hand, gamification does not present a statistically significant impact, which indicates that utilitarian and trust-related factors prevail over hedonic factors. These findings expand the literature on technology adoption by contextualizing the UTAUT2 model in the Bolivian delivery market and offer managerial implications for small and medium-sized enterprises that have their own delivery applications, providing evidence-based strategies to enhance competitiveness.

Keywords

Delivery applications, Technology adoption, UTAUT2 model, Facilitating conditions, Bolivia.

1. Introduction

The development of digital technologies has significantly altered the way firms and consumers interact with each other. In particular, the mass adoption of smartphones and access to mobile internet are facilitating the creation and adoption of mobile applications, which is essential for service management, e-commerce, and communication (GSMA, 2025).

In emerging markets, applications have enabled restaurants and small retailers to reach a wider audience without the need for their own technological infrastructure. For consumers, these applications represent convenience, speed, and a diverse range of options. The adoption of these digital tools in the region is linked to the growth in the use of smartphones and digital payments, factors that have reduced barriers to incorporating this type of service (Ray et al., 2019; Zanetta et al., 2021).

The retail delivery market in Bolivia has shown a sustained increase in the number of users and generated revenues, which indicates a shift in consumption patterns and how consumers access essential goods (Statista, 2025). The initial domestic success of platforms like NetComidas laid the necessary groundwork for digitalization. Subsequently, the arrival of international giants like PedidosYa and Yango dramatically accelerated this process, transforming the Bolivian market and firmly establishing food delivery and supermarket purchases as a significant and consolidated consumer alternative.

However, the use of these applications presents benefits and challenges. Integrating into a delivery application implies that a restaurant or retailer affiliates with the platform, offering its products through it in exchange for a commission on each sale made. This modality enables firms to gain immediate access to a broad customer base and outsource last-mile logistics, thereby reducing the need for their own technological infrastructure. The commissions applied range from 15% to 30% of the order value, which directly affects business profitability (Liu, 2023; Li, Miroso, & Bremer, 2020). On the other hand, some firms opt to develop their own application, which gives them greater control over their brand and over their customers' information. Nevertheless, this strategy usually implies substantial technological investments (Stocchi et al., 2021).

Regarding individual use, the use of mobile delivery applications depends not only on their market availability but also on users' perceptions of various factors, including usefulness, ease of use, and trust. These elements have been identified as determinants of the intention to adopt technology (Davis, 1989; Venkatesh, Thong, & Xu, 2012). However, in the case of Bolivia, the rapid expansion and diversification of these platforms has limited detailed analysis of such factors, opening a research gap.

Consequently, the present study is oriented toward analyzing the factors that determine the adoption of mobile delivery applications in Bolivia, with emphasis on the consumer perspective. To this end, it draws on consolidated conceptual frameworks in the literature, such as the Technology Acceptance Model (TAM) (Davis, 1989) and the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) (Venkatesh, Thong, & Xu, 2012), which allow understanding how variables such as perceived usefulness, ease of use, trust, and habit influence the acceptance of new technologies.

2. Literature Review and hypotheses

Research on technology adoption rests on conceptual models that explain how user perceptions translate into intention and use. Davis (1989) proposed the original TAM, where perceived usefulness and perceived ease of use explain intention to use. Venkatesh and Davis (2000) expanded this foundation by incorporating social and cognitive determinants. Subsequently, Venkatesh, Morris, Davis, and Davis (2003) integrated eight prior frameworks into UTAUT, with four core constructs: performance expectancy, effort expectancy, social influence, and facilitating conditions. In turn, Venkatesh, Thong, and Xu (2012) developed UTAUT2, which retains these constructs and incorporates hedonic motivation, price value, and habit, removing voluntariness as a moderator and offering greater predictive capacity outside organizational settings. Similar frameworks have also been applied to diverse sectors, such as mobile shopping in India (Tak & Panwar, 2017) and mobile nursing apps in China (Pan & Gao, 2021), highlighting the adaptability of UTAUT2 across contexts.

Recent literature emphasizes complementary variables that reflect the current digital experience. The perception of artificial intelligence is associated with efficiency, personalization, and interaction fluency, which increases the intention to use mobile services (Gursoy et al., 2019; Shankar, 2018; Pantano & Pizzi, 2020). Moreover, studies such as Xiong, Shi, Pu, and Liu (2023) reveal that user acceptance of AI-based assistants depends not only on perceived efficiency but also on the balance between trust and perceived risk. Legality strengthens trust and favors technology adoption (Balapour, Sabherwal, & Meshram, 2020). In addition, Lekjaeng and Sincharoonsak (2025) demonstrate that legality and responsibility strongly influence digital adoption, reinforcing the role of legality in shaping user behavior. Habit operates as behavioral automatization through repetition, raising both intention and effective use (Limayem, Hirt, & Cheung, 2007; Venkatesh et al., 2012). Hedonic motivation contributes to intention when enjoyment complements utilitarian value (Brown & Venkatesh, 2005; Davis, Bagozzi, & Warshaw, 1992). Yang and Koenigstorfer (2021) further indicate that hedonic features, such as gamification and motivational design, strengthen the intention to use fitness apps, insights that are transferable to delivery contexts. In parallel, gamification may reinforce intention in app environments, although its effect is contingent on the weight of utilitarian and trust factors (Burke, 2012). Similarly, Zhang et al. (2019) and Zhao, Zhao, and Wang (2022) confirm the importance of gamification and trust in predicting behavioral intention in health and delivery app environments, expanding evidence on UTAUT2 extensions.

Hypotheses

Facilitating conditions are defined as the user's perception of the availability of resources and infrastructure that enable the proper use of an application (Venkatesh, Thong, & Xu, 2012). In the case of delivery, they include stable connectivity, adequate devices, and reliable payment systems. When these conditions are perceived as favorable, users show greater willingness to adopt and continue using the application (Tam, Santos, & Oliveira, 2020). Similarly, Pan and Gao (2021) found that in mobile health contexts, the availability of resources and technical support significantly strengthens the intention to use. Therefore, two hypotheses are proposed:

H1a. Facilitating conditions have a positive and significant effect on use behavior.

H1b. Facilitating conditions have a positive and significant effect on the intention to use delivery applications.

The perception of artificial intelligence is understood as the extent to which the user recognizes that the application incorporates intelligent functions that enhance the experience, such as personalized recommendations or precise time estimates. Gursoy et al. (2019), Shankar (2018), and Pantano and Pizzi (2020) demonstrate that these perceptions foster innovation and efficiency, thereby increasing the intention to adopt. Xiong, Shi, Pu, and Liu (2023) further emphasize that the acceptance of AI based virtual assistants depends on balancing trust and perceived risk, which directly influences intention to use. In this study it is proposed that AI perception has a positive and significant effect on intention to use.

H2. The perception of artificial intelligence has a positive and significant effect on the intention to use it.

Social influence refers to the perceived pressure from essential others (e.g., family, friends, peers) to use a technology, shaping normative expectations about adoption (Venkatesh et al., 2003; Venkatesh, Thong, & Xu, 2012). Tak and Panwar (2017) showed that in mobile commerce, social influence is a key predictor of intention to use, especially in emerging markets such as India. In consumption contexts, favorable opinions from one's social circle tend to increase willingness to use apps and services.

H3. Social influence has a positive and significant effect on behavioral intention.

Legality (legality/security) relates to users' trust that their personal and financial data are protected and that the platform complies with applicable laws and regulations during interactions. Perceived security is a key determinant of technology adoption when sensitive information and payments are involved (Pavlou, 2003; Balapour, Sabherwal, & Meshram, 2020).

H4. Legality (legality/security) has a positive and significant effect on behavioral intention.

Habit refers to the tendency to perform behaviors automatically due to constant repetition (Limayem, Hirt, & Cheung, 2007). In UTAUT2, it is posed as a direct predictor of intention and effective use (Venkatesh et al., 2012). In delivery applications, users who place orders recurrently consolidate their habit, which increases both intention and actual behavior. Thus, two hypotheses are formulated:

H5a. Habit has a positive and significant effect on the intention to use.

H5b. Habit has a positive and significant effect on use behavior.

Ultimately, gamification involves incorporating game-based mechanics into non-game contexts to enhance user motivation and engagement (Burke, 2012). In delivery applications, this can be achieved through reward programs, user levels, or rankings that encourage repeat interaction. Based on the literature, gamification is proposed to have a positive and significant effect on intention to use.

H6. Gamification has a positive and significant effect on the intention to use.

In summary, this study proposes a conceptual model that extends UTAUT2 by incorporating emerging constructs, such as artificial intelligence, security, and gamification, alongside traditional variables, including facilitating conditions, habit, and hedonic motivation. These relationships enable the explanation of intention to use and actual use behavior of delivery applications in the Bolivian context. This will be the conceptual model to be analyzed in the study (see Figure 1).

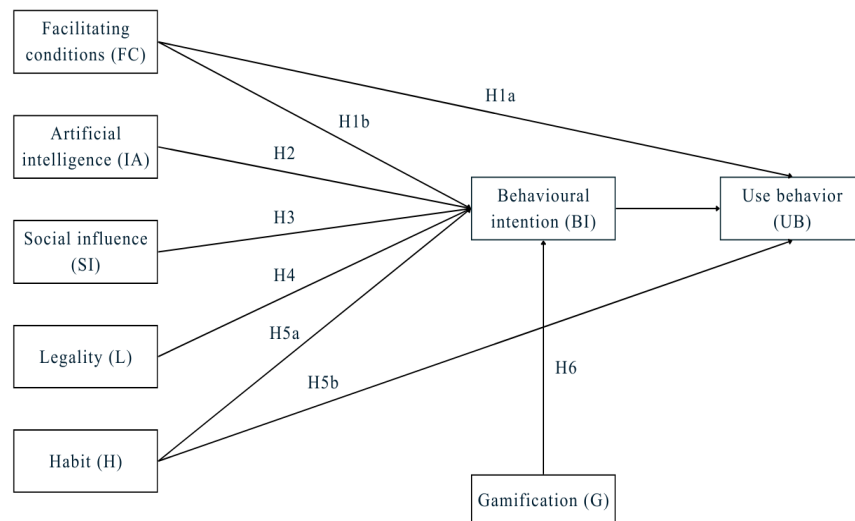


Figure 1. Extended UTAUT2 conceptual model

Source: Adapted from Venkatesh, Thong, & Xu (2012); extended by the authors.

3. Methods

This study adopted a quantitative, cross-sectional, and confirmatory design, aimed at empirically testing a conceptual model based on the extended UTAUT2. The methodological strategy focused on evaluating the validity of the model and estimating the magnitude of the proposed relationships through multivariate statistical techniques.

The measurement instrument was constructed from scales validated in previous research on technology adoption (Venkatesh, Thong, & Xu, 2012; Tam, Santos, & Oliveira, 2020), and all items were measured on a five-point Likert scale. Prior to its final application, the questionnaire was subjected to a content validation and a pilot test to ensure clarity and consistency. The statistical analysis was carried out in three phases. First, the reliability of the instrument was assessed using Cronbach's alpha coefficient, complemented by composite reliability and average variance extracted (AVE) to determine convergent and discriminant validity (Hair et al., 2019). Second, a confirmatory factor analysis was conducted to verify the structure of the measurement model and ensure that the constructs aligned with theoretical specifications. Finally, multiple linear regression was applied to test the hypotheses, estimating standardized coefficients (β) and their statistical significance. The use of this technique is justified by its ability to identify the direction and magnitude of the proposed effects, an approach widely validated in technology adoption studies (Baptista & Oliveira, 2015; Palau-Saumell et al., 2019).

4. Data Collection

The survey was conducted in 2024 and yielded a total of 415 responses, of which 403 were valid after the data wrangling process. This sample size ensures statistical representativeness as it exceeds the minimum recommended of 385 surveys for a 95% confidence level and a 5% margin of error (Krejcie & Morgan, 1970).

Table 1. Demographic Descriptive Analysis of Sample

Variable	Category	%
<i>Gender</i>	Female	54
	Male	46
<i>Socioeconomic level</i>	Low	18.5
	Middle	60.7
	High	20.8
<i>Frequency of use</i>	Non user	26
	1–2 times per month	44
	1–2 times per week	22
	Daily use	8
<i>Most used application</i>	PedidosYa	29.6
	WhatsApp (orders)	25.8
	Yango	10.1
	Own apps/others	34.5

Source: Authors' elaboration (2025).

As presented in Table 1, the sociodemographic profile of the respondents is summarized. The data show a balanced distribution by gender, a predominance of users from the middle socioeconomic level, and a frequency of use concentrated in occasional orders, although with a relevant segment of intensive users. Regarding the applications used, the leadership of PedidosYa coexists with significant use of WhatsApp and local applications, reflecting the diversity of market access strategies in Bolivia.

5. Results

Reliability and Validity

The reliability analysis showed a Cronbach's alpha of 0.870 for the overall scale, indicating excellent internal consistency and surpassing the minimum threshold of 0.70 (Nunnally, 1978). The values of composite reliability (CR > 0.70) and average variance extracted (AVE > 0.50) confirmed the convergent validity of the constructs (Hair et al., 2019). Likewise, discriminant validity was verified through the Fornell–Larcker criterion and the HTMT index, whose results supported the differentiation among constructs (see Table 2).

Table 2. Item Reliability Statistics

Construct	Mean	SD	Cronbach's Alpha
Facilitating conditions	4.4	1.38	0.834
Artificial intelligence	3.7	1.46	0.846
Social influence	4.01	1.42	0.84
Legality (Legality)	4.08	1.34	0.829
Habit	3.11	1.59	0.874
Gamification	4.54	1.56	0.865

Source: Authors' elaboration based on survey data (2025).

Correlations

Pearson correlations were calculated between constructs to explore preliminary associations and the direction of effects. In line with the literature, facilitating conditions are expected to show positive correlations with intention and use, and AI and security are expected to correlate positively with intention. More modest associations are anticipated for gamification, given the prevalence of utilitarian factors in essential services (Brown & Venkatesh, 2005).

Table 3. Correlation Matrix

Construct	Facilitating conditions	Artificial intelligence	Social influence	Legality	Habit	Gamification	Behavioral intention
Facilitating conditions	—						
Artificial intelligence	0.556***	—					
Social influence	0.650***	0.487***	—				
Legality	0.744***	0.696***	0.594***	—			
Habit	0.417***	0.526***	0.486***	0.489***	—		
Gamification	0.560***	0.392***	0.570***	0.514***	0.270** *	—	
Behavioral intention	0.758***	0.682***	0.662***	0.735***	0.611** *	0.455***	—

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Source: Authors' elaboration based on survey data (2025).

According to Table 3, the highest correlations were found between facilitating conditions and intention to use ($r = 0.758$) and between legality and intention to use ($r = 0.735$), indicating that technical and regulatory aspects are highly relevant for users when deciding to adopt delivery applications. Other variables, such as artificial intelligence ($r = 0.682$), social influence ($r = 0.662$), and habit ($r = 0.611$), also showed strong associations. These correlations empirically support the relationships proposed in the extended UTAUT2 model.

Multiple Linear Regression

The overall model was statistically significant, with a multiple correlation coefficient of $R = 0.861$ and an $R^2 = 0.741$, indicating that approximately 74.1% of the variance in the intention to use delivery applications is explained by the included predictors. This level of fit is high and comparable to previous studies using extended models in mobile commerce contexts (Baptista & Oliveira, 2015; Palau-Saumell et al., 2019).

Among the predictors, facilitating conditions emerged as the strongest and most consistent factor ($\beta = 0.379$, $p < 0.001$; $\beta = 0.298$, $p < 0.01$), confirming that technological infrastructure and reliable payment systems are critical determinants in emerging markets (Venkatesh et al., 2012; Tam, Santos, & Oliveira, 2020). The perception of artificial intelligence also showed a positive and significant effect on intention ($\beta = 0.205$, $p < 0.001$), aligning with findings that link AI to the efficiency and personalization of services (Gursoy et al., 2019; McLean & Osei-Frimpong, 2019).

Similarly, legality ($\beta = 0.139$, $p < 0.01$) reinforced the importance of trust in digital environments, consistent with Pavlou (2003) and Balapour et al. (2020). Habit influenced intention ($\beta = 0.214$, $p < 0.001$) but not actual use ($\beta = 0.108$, $p > 0.05$), suggesting that repetition alone does not guarantee behavior when external barriers persist.

In contrast, gamification ($\beta = -0.059$, $p > 0.05$) was not significant, indicating that in the Bolivian context, users prioritize utilitarian and trust-related factors over playful incentives (Hamari & Koivisto, 2015; Hsu & Chen, 2018). Finally, the intention to use had a positive and robust effect on actual behavior ($\beta = 0.422$, $p < 0.001$) (Table 4), consistent with the causal chain proposed by the Theory of Planned Behavior (Ajzen, 1991) and the UTAUT2 (Venkatesh et al., 2012).

Table 4. Multiple Linear Regression Results

Predictor	Std. Estimate (β)	t	p
Facilitating conditions	0.379	8.96	<.001
Artificial intelligence	0.205	5.49	<.001
Social influence	0.162	4.3	<.001
Legality	0.139	3.08	0.002
Habit	0.214	6.69	<.001
Gamification	-0.059	-1.79	0.075

Dependent variable: Behavioral intention.

Source: Authors' elaboration based on survey data (2025)

Therefore, Figure 2 presents the final model obtained, where significant effects are represented by solid lines and non-significant effects by dashed lines. The model synthesizes that the adoption of delivery applications in Bolivia is driven mainly by facilitating conditions, artificial intelligence, security, and, to a lesser extent, habit, while gamification and hedonic motivation do not emerge as relevant determinants.

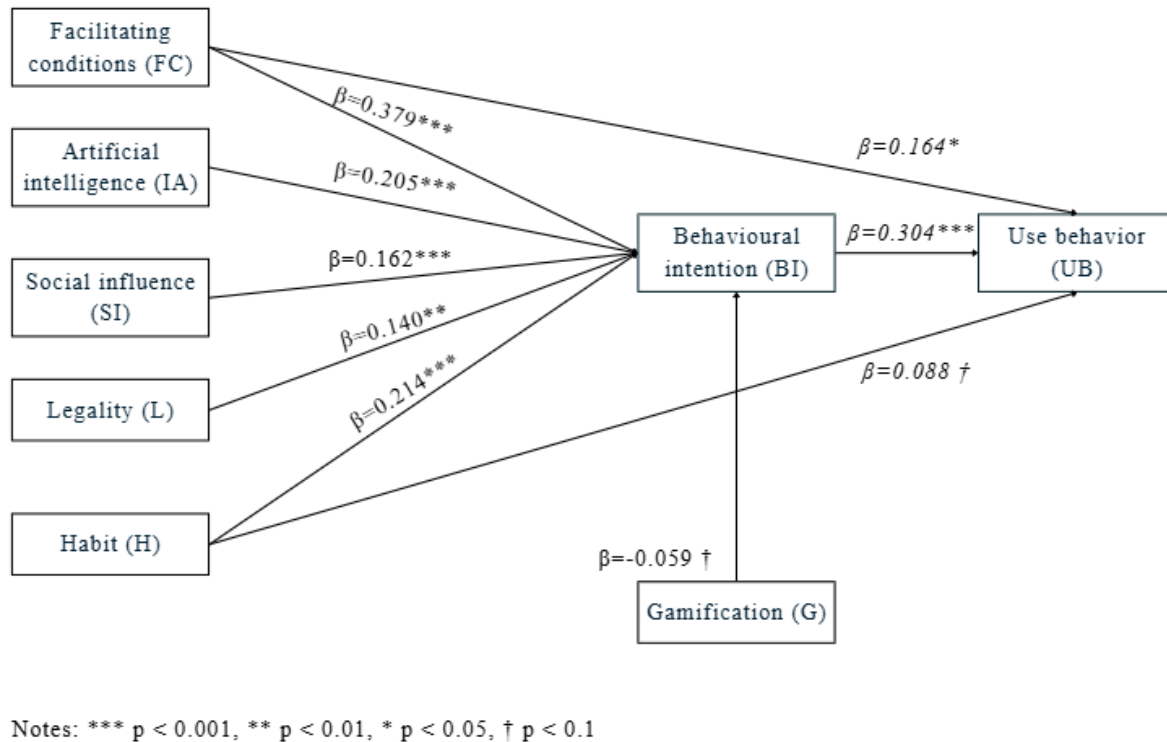


Figure 2. Extended UTAUT2 conceptual model with standardized regression coefficients
Source: Authors' elaboration based on survey data (2025).

6. Conclusion

Facilitating conditions, artificial intelligence (AI), social influence, legality, and habit contribute to positive behavioral intentions in using delivery apps by addressing both external and internal determinants of technology adoption. This can be explicated from multiple perspectives within extended technology acceptance models such as the Unified Theory of Acceptance and Use of Technology (UTAUT) and its variants.

First, facilitating conditions—defined as the degree to which users perceive that technical and organizational infrastructures exist to support system use—reduce the cognitive and operational barriers associated with adopting delivery apps. Studies have shown that when users have access to reliable internet, user-friendly interfaces, seamless payment gateways, and robust customer support, their perceived ease of use increases, leading to a higher likelihood of forming a positive intention toward app use (Pan & Gao, 2021; Zhao et al., 2022). This supportive environment not only enables the effective functioning of the application but also lowers resistance resulting from technological complexity, thus reinforcing behavioral intentions.

Second, the integration of AI within delivery apps enhances performance expectancy by automating personalized recommendations, optimizing delivery routes, and tailoring user experiences in real time. The incorporation of AI makes the apps appear more innovative and efficient, thereby raising users' expectations regarding the quality of service and operational speed (Xiong et al., 2023). This technological sophistication convinces users that the app can better meet their needs compared to less technologically advanced alternatives, which results in a higher behavioral intention to use the app.

Third, social influence reflects the impact of opinions, recommendations, and normative pressures exerted by peers, family, or influential community figures. Numerous studies indicate that individuals are more inclined to adopt technologies when they observe that their social network endorses or actively uses such systems (Zhang et al., 2019; Tak & Panwar, 2017). In the context of delivery apps, positive word-of-mouth, ratings on social media platforms, or

endorsements from trusted influencers serve as critical signals of the apps' reliability and practical value. This social validation effectively shapes users' attitudes and strengthens their behavioral intentions to engage with these services.

Fourth, legality—understood as adherence to regulatory guidelines, industry standards, and ethical practices—conveys a sense of trust and security among users. When delivery apps transparently comply with data protection policies, food safety regulations, and secure payment protocols, users perceive a lower level of risk associated with using the service. Although research explicitly examining legality in delivery app usage is limited, analogous findings in other technology adoption domains indicate that legality with established standards can significantly enhance trust, thereby bolstering behavioral intention (Lekjaeng & Sincharoonsak, 2025). This assurance of ethical and legal conformity acts as an implicit endorsement, reducing perceived uncertainty and motivating users to adopt the technology.

Finally, habit emphasizes the importance of repeated use and the development of routine behavior. Habitual usage emerges from consistent, positive past interactions with technology, reducing the cognitive effort required to initiate each new transaction. Empirical evidence across mobile applications has demonstrated that habitual behavior is one of the strongest predictors of continued usage. Once using a delivery app becomes an ingrained part of a user's daily routine, the decision to order through the app becomes almost automatic, further reinforcing positive behavioral intentions toward its continued use (Tak & Panwar, 2017; Yang & Koenigstorfer, 2021). This automaticity in behavior, cultivated over repeated exposure, ensures that even minor enhancements in performance or usability support sustained engagement.

In summary, the synergistic effect of accessible facilitating conditions, advanced AI functionalities, persuasive social influence, adherence to legality standards, and established usage habit creates an ecosystem that significantly lowers barriers to adoption and builds user trust. Together, these factors shape favorable attitudes and intentions, thereby driving the widespread adoption and continual use of delivery apps.

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Jarin Canaza Fernandez is an Industrial Engineer graduated at the Bolivian Catholic University, with experience in multinational companies and a strong commitment to research and transformation in supply chains. His academic and professional work focuses on topics such as resilience, operations optimization, and technology adoption, through applied modeling methodologies to resolve the logistical challenges of emerging economies. He participated in social impact projects in the fields of higher education, risk management, and logistical disruptions, and in 2025 was invited to collaborate as a Technical Reviewer at the South American IEOM Conference. He currently leads the Supply Chain and Logistics Research line at the Bolivian Industrial Research and Development Group (BIRDG) and was admitted to the Global Supply Chain and Logistics Excellence (GCLOG) program at MIT (Class of 2026).

Camila Silvente Villarroel is an Industrial Engineering student at the Bolivian Catholic University "San Pablo", with practical experience across multiple industrial sectors and a growing commitment to research and development. Her academic and professional work demonstrates a strong foundation in industrial safety, production optimization, and data analysis, gained through diverse internship experiences at leading companies. Camila currently serves as a Research Assistant for the Bolivian Industrial Research and Development Group (BIRDG), where she has co-authored her first academic publication, demonstrating her commitment to advancing industrial engineering knowledge and research.

María Eugenia Lamas Mendoza is an Industrial Engineer, graduated in 2025 from the Bolivian Catholic University "San Pablo." Her undergraduate thesis focused on the optimization of the production line of the electric vehicle E4 at Quantum Motors S.A., applying Factory Physics methodology and simulation tools to propose improvements in

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Alejandra Pamela Suarez Garcia is an Industrial Engineer from the Bolivian Catholic University with experience in process optimization, quality management, and continuous improvement. She has professional experience in manufacturing companies, working in production areas and applying practical solutions to enhance efficiency. Her graduation project focused on improving the layout of a notebook production line through simulation tools, achieving measurable productivity improvements. Currently, she is a Research Assistant at the Bolivian Industrial Research and Development Group (BIRDG), collaborating on projects in logistics and supply chain management. Her research interests include logistics operations, technology adoption in emerging economies, and strategies for optimizing supply chain performance.