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Direct and Indirect Effect of Last Mile Logistics Performance on User Intention of Crowdsourced Delivery Services

TESIS PARA OBTENER EL GRADO DE DOCTOR EN ADMINISTRACIÓN ESTRATÉGICA DE EMPRESAS

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Dedication

This study is dedicated to God, my strong pillar, my source of inspiration, knowledge and understanding. I also dedicate this work to my dear mother, Elvia Regalado, who has been nicely my supporter until my research was fully finished, and my beloved wife who, has encouraged me attentively with her fullest and truest attention to accomplish my work with truthful self-confidence. Thank you. My love for you all can never be quantified. God bless you.
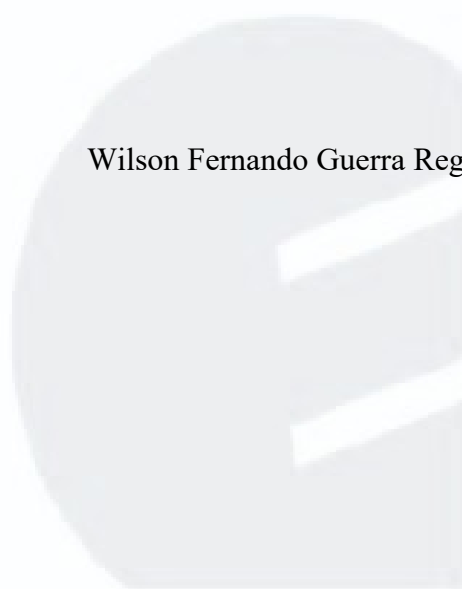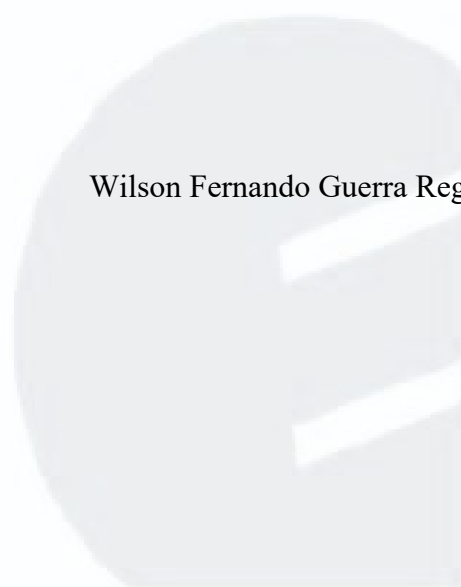
Wilson Fernando Guerra Regalado

Acknowledgements

Abstract

The literature on crowdsourced logistics" (CSL) and edge logistics so far has primarily focused on the perception of consumers as "co-creators of logistics". However, there is a breach in the literature about the perception of consumers as recipients of these logistics services. The purpose of this research was to analyze the direct effect of Last Mile Logistics Performance (LMLP), on the User Intention (UI) of the end user of crowdsourced delivery platforms, and indirect through Perceived Confidence (PT) and Performance Expectation (PE). The applied methodology comprises 721 surveys, gathered through a validated instrument. For the analysis, a Structural Equations Model (SEM) was applied, by partial least squares. The selected model had strong Fit Indexes (CFI=0.976; TLI=0.970; RMSEA; = 0.044; SRMR=0.025). There is no direct effect of LMLP and PT over UI (p = 0.175; 0.054). However, the standardized indirect effect of LMLP in IU, mediated by PT is, 0.699; while the standardized indirect effect of PT in IU, mediated by PE is 0.664. The conclusion is that LMLP and PT are seemed by the final users of crowdsourced delivery services as part of the performance of the business as a whole at the moment of deciding to use these platforms. For future research, it is recommended first, to investigate factors associated with culture; second, to stratify the results to assess differences between age groups; third, to study internal factors that can affect the intention to use these platforms, such as user experience, ease of use, perceived control, which were not considered; fourth, to perform an investigation that contemplates brand differences.

Keywords: Last mile logistics performance, Perceived trust, crowdsourced delivery, Final user intentions.
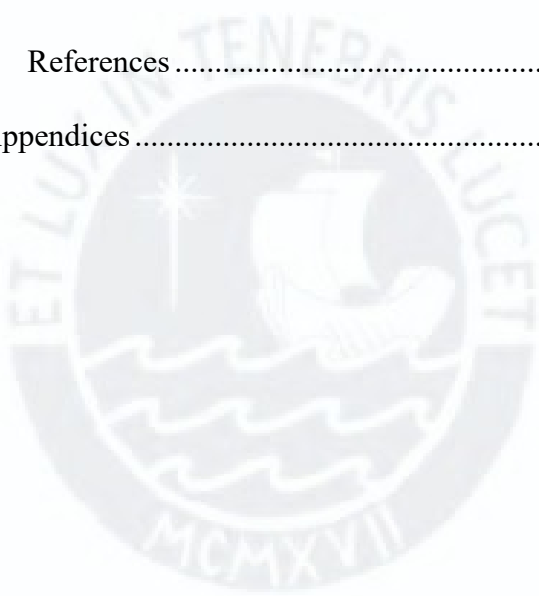
Resumen Ejecutivo

La literatura sobre logística colaborativa" (CSL) y logística de última milla hasta ahora se ha centrado principalmente en la percepción de los consumidores como "co-creadores. Sin embargo, hay una brecha en la literatura sobre la percepción de los consumidores como destinatarios de esta logística. El propósito de esta investigación fue analizar el efecto directo del Rendimiento Logístico de Última Milla (LMLP), sobre la Intención de Usuario (UI) del usuario final de las plataformas de entrega colaborativas, e indirecto a través de la Confianza Percibida (PT) y la Expectativa de Desempeño (PE). La metodología aplicada consta de 721 encuestas, recolectadas a través de un instrumento validado. Para el análisis se aplicó un Modelo de Ecuaciones Estructurales (SEM), por mínimos cuadrados parciales. El modelo seleccionado presentó Índices de Ajuste fuertes (CFI=0.976; TLI=0.970; RMSEA; = 0.044; SRMR=0.025). No hay efecto directo de LMLP y PT sobre UI (p = 0,175, 0,054), pero sí existen relaciones indirectas. La conclusión es que LMLP y PT son considerados por los usuarios finales de los servicios de entrega colaborativos como parte del desempeño de la empresa en su conjunto al momento de decidir utilizar estas plataformas. Para futuras investigaciones, se recomienda primero, investigar factores asociados a la cultura; segundo, estratificar los resultados para evaluar diferencias entre grupos de edad; tercero, estudiar factores internos que pueden afectar la intención de uso de estas plataformas, como la experiencia del usuario, la facilidad de uso, el control percibido, que no fueron considerados; cuarto, realizar una investigación que contemple las diferencias de marca.

Palabras clave: desempeño logístico de última milla, confianza percibida, entrega colaborativa, intenciones del usuario final.

Table of Contents

Introduction

This thesis is structured in two Chapters. The first Chapter presents the research paper accepted for publication, which is required to complete the degree of Doctor en Administración Estratégica de Empresas granted by the Pontificia Universidad Católica del Perú through its graduate school in business management, CENTRUM PUCP. The second Chapter includes the main conclusions and recommendations of the thesis. Therefore, Chapter 1 of this thesis includes the research paper entitled Direct and indirect effect of Last Mile Logistics Performance on user intention of crowdsourced delivery services, which was accepted for publication by Transportation Research Interdisciplinary Perspective on August 24, 2022 (see Appendix A, letter of acceptance or message accepting the paper). This journal is part of the Elsevier Web of Science, in quartile one Q1.

This paper dealt with the direct effect of Last Mile Logistics Performance (LMLP), on the Intention to Use (UI) of the end user of crowdsourced delivery companies, and indirect through Perceived Confidence (PT) and Performance Expectation (PE). The method applied was Structural Equations Model (SEM), by partial least squares, applied to the results of 721 surveys gathered through a validated instrument. The main purpose of this work is to analyze the direct effect of Last Mile Logistics Performance (LMLP), on the Intention to Use (UI) of the end user of crowdsourced delivery companies, and indirect through Perceived Confidence (PT) and Performance Expectation (PE).

The significance of this work is founded in the breach of the existing literature about the importance of last mile logistics performance in the final user intention. So far, the literature on crowdsourced logistics" (CSL) and edge logistics has primarily focused on the perception of consumers as "co-creators of logistics", rather than the perception of consumers as recipients of these logistics. Thus, the evaluation of this phenomenon is important

specially for all those linked to retail and electronic commerce in the region. The applied

methodology comprised 721 surveys, gathered through a validated instrument. For the

analysis, a Structural Equations Model (SEM) was applied, by partial least squares. The

selected model had strong Fit Indexes (CFI=0.976; TLI=0.970; RMSEA; = 0.044;

SRMR=0.025). There is no direct effect of LMLP and PT over UI (p = 0.175; 0.054).

However, the standardized indirect effect of LMLP in IU, mediated by PT is, 0.699; while the

standardized indirect effect of PT in IU, mediated by PE is 0. 664.The conclusions showed

that the LMLP is linked to the decision of the final user as part of the whole business model,

and the same effect was found on the perceived trust.
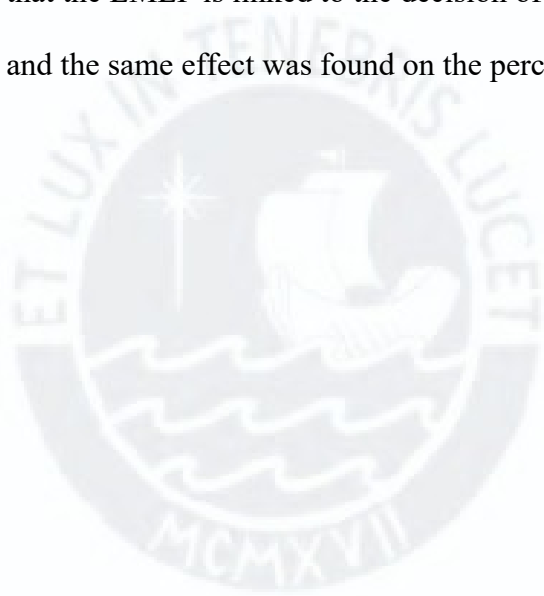
Chapter I: The Research Article

The research paper, Direct and indirect effect of Last Mile Logistics Performance on user intention of crowdsourced delivery services, was acceptor for publication on August 24th 2022 in the International Journal of Production Economics. This journal is part of the Transportation Research Interdisciplinary Perspectives (ISSN 25901982) and is indexed on Scopus in quartile Q1. The paper will be appearing in the Volume 16 December 2022.

Direct and indirect effect of Last Mile Logistics Performance on user intention of crowdsourced delivery services

Summary

Background

The literature on crowdsourced logistics" (CSL) and edge logistics so far has primarily focused on the perception of consumers as "co-creators of logistics", rather than the perception of consumers as recipients of these logistics. All those linked to retail and electronic commerce must identify how to align their strategies to the expectations of their customers in each region.

Purpose

Analyze the direct effect of Last Mile Logistics Performance (LMLP), on the Intention to Use (UI) of the end user of crowdsourced delivery companies, and indirect through Perceived Confidence (PT) and Performance Expectation (PE).

Methodology

721 surveys were carried out. The instrument was validated through content, construct and criterion validity. For the analysis, a Structural Equations Model (SEM) was applied, by partial least squares.

Results

(CMIN/DF = 2.415), Comparative Fit Index (CFI; = 0.976), Tucker-Lewis Index (TLI; = 0.970) and Root Mean Square Error of Approximation (RMSEA; = 0.044) and, Standardized Root Mean Square Residual (SRMR=0.025). LMLP has no effect in the SU (p = 0.175), as does PT in the SU (p = 0.054). However, the LMLP has an effect on the EP (p = 0.000) and on the PT (p = 0.000) of the consumer. The PE has an effect on the UI (p = 0.000), just as the PT has an effect on the PE (p = 0.000). The standardized indirect effect of LMLP in IU, mediated by PT is, 0.699; while the standardized indirect effect of PT in IU, mediated by PE is 0.664.

Limitations and future research

First, despite what was expected, the good performance of last-mile delivery logistics did not turn out to be a determinant of the intention to use, therefore there must be factors associated with culture that should be further investigated. Second, it is recommended to stratify the results to assess whether there are differences between age groups. Third, to study internal factors that can affect the intention to use these platforms, such as user experience, ease of use, perceived control, which were not considered. Fourth, a survey was carried out in a general way, without contemplating differences in brands or trade names, so an investigation that contemplates these differences is recommended.

Conclusion

The importance that the end user places on the efficiency of last-mile delivery and the perceived trust when deciding to use crowdsourced delivery services can be understood, while understanding this decision through the perceived performance of the entire model. of business.

Practical implications

Managers of crowdsourced delivery businesses can draw strategies focused on lower costs taking into account it could be argued that in this market as long as delivery is met it does not matter if it is fast or reliable.
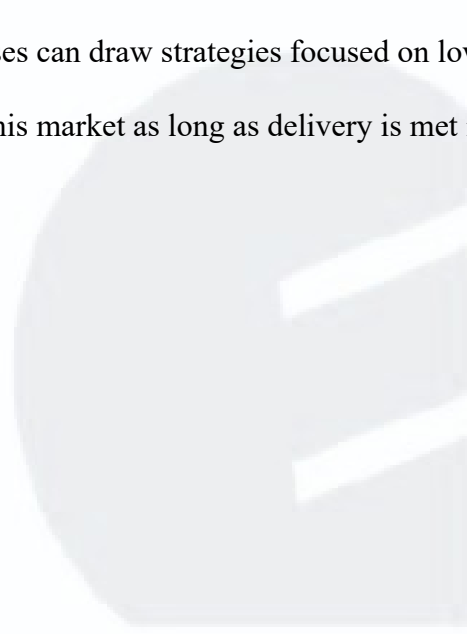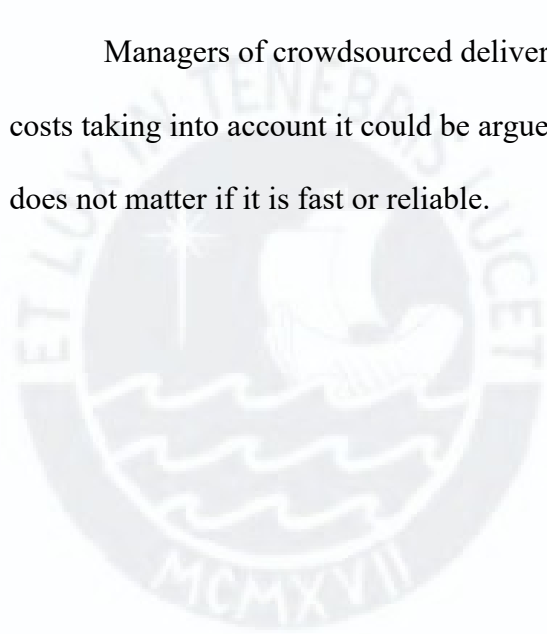
Introduction

The rise of e-commerce in the last 20 years has created a greater need for responsive omnichannel distribution to meet the challenge of the last mile (Frederick & Srai, 2018). Same-day delivery has become a standard offering for large retailers like Amazon, Target, and Best Buy, bringing with it the challenge of balancing cost and efficiency of service in the last mile of the supply chain, in order to meet the highest expectations of customers while facing competition in the market (Castillo et al., 2021). Some companies are experimenting with the use of the sharing economy business model to increase distribution strategies (Ciobotaru & Chankov, 2021; Seghezzi & Mangiaracina, 2021), thus the use of the so-called "crowdsourcing logistics" (CSL) it is more and more frequent in practice, while the academic interest in the area of last-mile logistics has increased significantly (Castillo et al., 2018; Ciobotaru & Chankov, 2021).

In order to guarantee the effectiveness of capillary or last-mile distribution, new concepts such as crowdsourcing have been applied, which is a type of strategy in which work normally carried out by company personnel is assigned to external collaborators, being a solution in many cases of low or no cost (Frederick & Srai, 2018; Zhong et al., 2021). Companies may look to add collaborative delivery capabilities when trying to enter new geographic markets or when they want to take advantage of the ability to rapidly scale delivery capacity without additional costs of fleet ownership (Castillo et al., 2021). Those companies that are able to find the right trade-off between cost and service in last-mile delivery can gain a significant competitive advantage (Boyer et al., 2009; Esper et al. 2003; Lim et al., 2018; Lu et al., 2020).

That is why the importance of the performance of last-mile logistics in the value generation process is highlighted, both for customers and for businesses (Castillo et al.,

2021), which includes multiple determining factors in the effectiveness of the delivery, such as having the products available in less time, in the comfort of the place where the delivery is requested and without damage (Ciobotaru & Chankov, 2021; Pufahl, et al., 2020). In this way, managers, especially those linked to retail and electronic commerce, must identify how to align their strategies to the expectations of their customers in each region, as a differentiating and competitive element (Breivik et al., 2020). Thus, the distribution of last mile logistics involves the operational and technological aspects of the company, which allow efficient deliveries, and in general with effectiveness in warehouse and transport operations, as well as in the satisfaction and coverage of customer expectations (Hellstrom et al., 2019).

For retailers, collective logistics is presented as a flexible, affordable, efficient and scalable solution to the challenge of last-mile delivery (Buldeo et al., 2021). However, there is still research on capturing value through the crowd (Castillo et al., 2018). In filling this knowledge gap, it is important to consider the receiving end of the last-mile supply chain, that is, the consumers (Buldeo et al., 2021).

In the retail business environment, the consumer is the one who defines and dictates the destination of the last mile, according to his convenience (Savelsbergh & Woensel, 2016). For managers, it is essential to take into account the way in which consumers evaluate last-mile services in crowdsourcing models and how their decisions affect successful business relationships in the long term (Meidutė Kavaliauskienė et al., 2014; Van Duin et al. al., 2018). Since the success of crowdsourcing models is based on the inclusion of relevant stakeholders, it is necessary to take into account the preferences and perceptions of consumers (Lim et al., 2018).

For online and omnichannel retail businesses, last-mile logistics stands out as one of the most important processes in the consumer's purchase decision (Murfield et al., 2017). In

particular, the last mile of the supply chain increasingly affects consumer satisfaction, which is why "crowd logistics" or "collaborative logistics" is presented as a promising solution. As consumers increasingly drive innovation and last-mile initiatives, it is important to understand the factors that determine their expectations, preferences and perceptions (Buldeo et al., 2021).

Addressing last-mile collaborative delivery capabilities is not necessarily a new concept in academic research; in fact, the use of collaborative delivery systems has a rich literature in operations (Ahmad et al, 2020; Castillo et al., 2021; Castillo et al, 2018; Ciobotaru et al., 2021; Guo, 2019; Park et al.; 2016). However, most of this research proposes a clear problem for businesses (Bopage et al., 2019; Castillo et al., 2021; Castillo et al. 2018; Kohler, 2017) and collaborating partners (Ciobotaru et al., 2021; Guo et al., 2019), leaving a gap on the impact of DLUM on performance expectations (PD) (Zhou et al., 2020; Felch et al., 2019), perceived trust (PC) (Leon et al., 2021) and the intention to use (UI) (Buettner, 2017; Collier & Kimes, 2012; Hazen et al., 2012; Vogel et al., 2017) of end users.

Despite these findings, the literature so far has primarily focused on the perception of consumers as "logistics co-creators" acting as a crowd (Wang et al., 2019), rather than the perception of consumers as recipients of these services. It is important to analyze how the performance of last mile logistics (DLUM) influences the consumer's expectation of performance and perceived confidence in crowdsourcing delivery models, as well as their intention to use them. Therefore, this study seeks to capture the attitude of consumers towards last-mile logistics under the crowdsourcing model.

Due to the dynamic nature of crowdsourcing innovation, the relative advantages and complexities of the DLUM effect are not yet fully understood. Therefore, an exploratory research effort is needed to fill these gaps in the literature on how DLUM affects the end

customer's performance expectation of the service in general and how this affects their intention to use. On the other hand, since crowdsourcing has high levels of uncertainty (e.g., unknown collaborative workers and relationship management difficulties), it is essential to understand the risks of crowdsourcing for those involved (Liu et al., 2016) and its effect on intention to use. Furthermore, there is a gap on the effect that last-mile logistics performance has on end-user confidence in collaborative distribution systems. Consequently, we seek to analyze the direct effect of Last Mile Logistics Performance (LMLP), on the Intention to Use (UI) of the end user of crowdsourced delivery companies, and indirect through Perceived Trust (PT) and the Performance Expectation (PE).

Literature review

Considering the diverse needs of retailers regarding the performance of last-mile logistics, collective logistics opens up several benefits. In the same way, it is important to investigate the importance of last-mile logistics performance in the consumer's intention to use crowdsourced delivery platforms, and thus also the perceived trust in acceptance seen from the intention of use. In order to identify the pertinent literature, a search was developed based on key words or phrases such as crowdsourcing, last mile, capillary distribution, collective delivery, cooperative delivery, performance expectation, perceived trust and intention to use, from which were initially obtained 195 results, to finally limit the selection of references to a number of 88 published works. The selection was made based on relevance, the most recent information, positioning in general and academic search engines, and the reputation of the publishing journal.

Basis of the proposed theoretical model

The intention to use Crowdsourcing platforms has been analyzed from various theoretical perspectives, some of them analyze the motivation of collaborators to accept

Crowdsourcing models to create new solutions for the community such as work design theories (García, 2016) ; Crowdsourcing from the perspective of innovation, under the approach of the Innovation Diffusion Theory (Wilson et al., 2018); Crowdsourcing as an element to create Corporate Social Responsibility (Park et al., 2020), from the theoretical perspective of dialogic communication and; the acceptance of Crowdsourcing as a technological element from the perspective of the theoretical model predecessor to UTAUT, the Technological Acceptance Model (TAM) (Correia et al., 2021; Mohd, 2020).

Behavioral intention is proposed to be the main dependent construct and as such represents user acceptance in this study. The exclusion of current use behavior is based on the rationale that behavioral intention is the key predictor of current use behavior and is therefore a good mediator of the effect of other constructs on behavior (Ajzen & Fishbein, 1985; Ajzen, 1991; Pavlou & Fygenson, 2003; Taylor & Todd, 1995; Venkatesh et al., 2003). Within the academic field, one of the most significant gaps in the study of the UI of crowdsourcing platforms is the determination of the effect of Last Mile Logistics Performance (DLUM) on the Intention to Use (UI) (Frederick & Srai, 2018; Guo et al., 2019), as well as the direct effect of Perceived Trust (PC) on DE (Shao et al., 2019) and the mediating effect of PC on UI (Leon et al., 2021).

Despite the benefits that collaborative work systems represent, empirical evidence determines that crowdsourcing models have implicit risks for their participants. Liu et al. (2016a) point out a positive association of social system risks with technical system risks, which in turn negatively affect crowdsourcing performance. Crowdsourcing is often risky because crowd workers are not safe and the process, in turn, is difficult to control in a virtual environment (Liu et al. 2016b). Faced with the need to contract a risky service, consumers

should assess their confidence in the accuracy of their provider's recommendation by taking into account at least two sources of uncertainty.

First, consumers may consider the likelihood that the service provider will not deliver the service due to incompetence. And second, they may consider the possibility of fraud on the part of the provider. Consumer trust involves both the belief that the provider of the product or service has specific expertise and knowledge, and the belief that he or she is concerned about the welfare and best interests of the consumer (Barnett, 2005).

Existing literature has primarily focused on discussing trade-offs involving various last-mile delivery modes (Deutsch & Golany, 2017; Park et al., 2016). Currently, there are very few theoretical studies that explore the effect of DLUM on consumer behavior, which is generally approached from the acceptance of businesses and collaborators (Leon et al., 2021; Yuen et al., 2018). The logistics industry is now facing intense competitive pressure as well as growing customer demand, forcing the industry to handle things differently to develop service innovations (Busse & Wallenburg, 2011; Da Mota Pedrosa, 2012). More recently, with the strong proliferation of e-commerce around the world, innovative last-mile delivery solutions are also emerging, such as drone delivery (Cordon et al., 2016; Murray & Chu, 2015; Leon et al., 2021), crowdsourcing (Castillo et al., 2021; Correia et al., 2021; Guo et al., 2019), the electric charging vehicle (Lebeau et al., 2016), reverse logistics (Hazen et al., 2011) and self-collection through the Automated Parcel Station (APS) (Morganti et al., 2014a, 2014b).

Conceptual research model and hypothesis development

Despite some notable positive results, from the literature there is no solid analysis that allows evaluating the effect that the performance of last mile logistics has on the performance expectation of these crowdsourcing platforms and on the trust that this generates in users –

consumers (Ahmad et al., 2019; Castillo et al., 2018; Cordón et al., 2016). Attitude that lies in

the expectations and distrust of consumers, which has to be considered by companies when

adhering to these new business models (Mohd et al., 2020), it is necessary to consider the

behavior of users before these new changes, for which models or theories are used to study

the acceptance and use of these models by consumers (Lu et al., 2017; Rahi et al., 2019).

Next, the proposed model is presented in Fig. 1, with the details of the constructs and the

hypotheses proposed.

Figure 1

Theoretical model
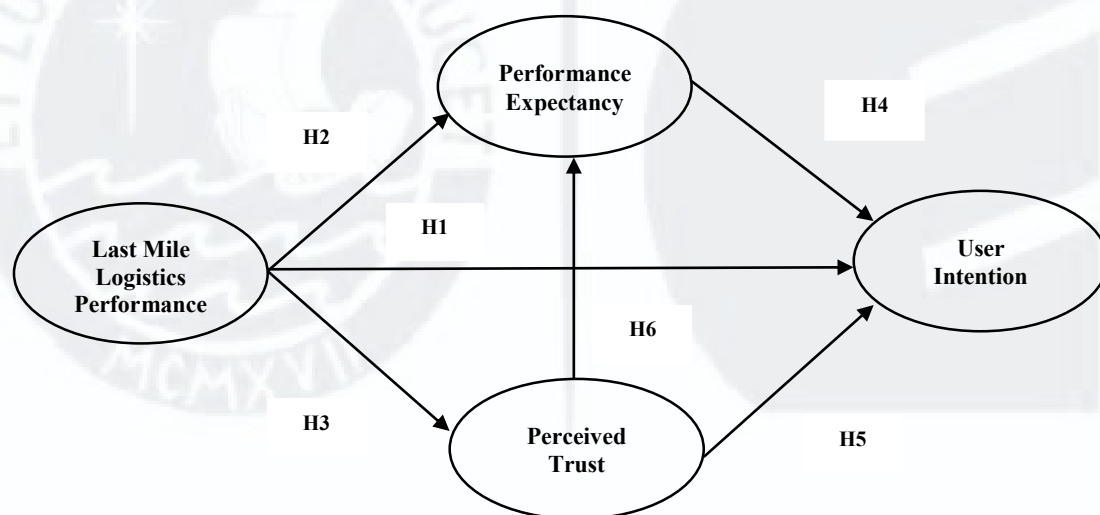
Note. Representation of the Research Model that will be addressed in the Research. The effect of
DLUM on the suggestions issued in Leon, et al., A. (2021) are taken into account. Consumers'
perceptions of last mile drone delivery. International Journal of Logistics Research and Applications
and Zhou et al. (2020). Understanding consumers' behavior to adopt self-service parcel services for
last-mile delivery. Journal of Retailing and Consumer Services, 52.

H1- LMLP directly affects the UI of the crowdsourced delivery platforms in the

users

Since consumers value the operator that actually delivers their Internet purchases

efficiently, consumers' perceptions of the operator's performance can affect purchase

decisions (Esper et al., 2003). In this sense, Bopage et al. (2019) state that: "Last mile

delivery performance has become the most crucial factor in the relationship between the e-commerce retailer and the end customer" (p. 2338), since the establishment will depend on this or the rupture with the client who, faced with poor performance, will stop requesting the services or products offered by the company. Beliefs of innovations that are perceived as attractive features that promote consumer adoption of the last-mile service are considered to have an effect on the intention to purchase services promoted online (Wang et al., 2020).

Last-mile delivery performance has become the most crucial factor in the relationship between the e-commerce retailer and the end customer, as it can make or break the link, directly affecting the customer's intent to use (Bopage et al., 2019). Customers have many online shopping options to switch. Therefore, retailers put pressure on last-mile service providers to optimize their performance (Zambrano, 2020). The challenge lies in the reaction of last-mile service providers in meeting the requirements of increased package demand. Therefore, maintaining profitability and high service quality are essential for last-mile delivery service providers to succeed in online business (Bopage et al., 2020).

H1a- LMLP has an indirect effect on the UI through PT

In the context of last mile logistics, it is possible to find the mediating effect of trust between customer satisfaction and behavioral intentions, such as word of mouth (Loureiro et al., 2014). Therefore, users of online services who are satisfied with the service provided and trust on crowdsourced platforms are expected to say positive things and recommend them to others, and this will be reinforced by their trust in web platforms (Castillo et al., 2021). In this sense, the effects of convenience, privacy security, and trustworthiness of customers intent to mediate the perceived value that final users have of last-mile logistics (Yuen et al., 2018), that eventually affect their intention to use these platforms (Ta & Esper, 2018).

H2- LMLP directly affects the PE of the users of crowdsourced delivery platforms.

The "last mile" delivery service is a major challenge of logistics service performance, given that online commerce provides customers with a visual, convenient, personalized and diversified shopping experience (Guo et al., 2019; Zhou et al., 2020; Zhong et al., 2021). Last-mile delivery occupies the most time and cost among all logistics operations, and has become the most critical issue affecting logistics service efficiency (Guo et al., 2019; Yuen et al., 2018; Zhong et al., 2021) and the expectation of efficiency that the consumer has about the contracted service (Leon et al., 2021; Zhou et al., 2020), which includes crowdsourcing services (Felch et al., 2019).

Bopage et al. (2020) point out that one of the main causes of failures in the implementation of last-mile logistics is the lack of adequate studies on the expectations of vendors, last-mile service providers (uber eats, glovo, etc.) and the customers. As already supported in the previous section, the logistics of the last mile is the transport management which focuses on the last journey that has to be made in the delivery to the final customer. Said management, within a modern, globalized and rapidly changing world, has been greatly influenced by technological changes, which have allowed companies to achieve greater speed of delivery, logistics monitoring and faster resolution of problems (Wang et al., 2020).

Such changes have not only served companies to generate a better balance between the speed of delivery and the costs of such an operation, but also to enable sales in which the customer can use technology, in order to participate as a key piece of logistics processes (Bopage et al., 2020). This is how today there are multiple logistics tracking systems that allow users to supervise, modify and control the entire process of the last mile from any device with an internet connection, which has made more users interested in using technology, thus valuing its benefits in the performance of deliveries, the closeness and

possibility of control over the processes and the satisfaction generated by the delivery times and the ease of solving problems through online communication, situations that build a direct relationship of the logistics of the latter on technology performance or performance expectations (Wang et al., 2020).

Thus, according to Zambrano et al. (2020), logistics procedures demand integrated ICT systems that help meet expectations, in terms of achieving the operational objectives set, so that it can meet the needs of consumers, who can use technology to join and actively participate in those logistics procedures, which will make their expectations about the benefits of technology grow. At this point, what Vakulenko et al. (2019) on last-mile logistics execution and its reliance on the interdependencies of ongoing service innovations, changing consumer behavior, and consumer expectations based on technological changes. In the same study Vakulenko et al. (2019) stated that, each time the demands of consumers in terms of the time it takes for delivery and the place where it is made are greater, and the intentions of suppliers and retailers to comply with these demands are also seen challenged, because they translate the satisfaction of consumer desires into loyalty.

H3- LMLP positively affects the PT of the users of crowdsourced delivery platforms.

Leon et al. (2021) point out that as the perceived privacy risk increases, the intention to adopt the last-mile delivery service decreases. They find that concern for perceived trust is an important factor in the adoption of capillary delivery (Liu et al., 2016a; Liu et al., 2016b). Apply the concept of perceived risk and find that time risk, performance risk and psychological risk have a significant negative influence on the image of delivery services, emphasizing the capillary logistics process. Ray et al. (2020) suggest that a comprehensive in-depth study to assess delivery efficiency and reduce risk and increase trust in the last-mile

logistics sector could be an important area of research due to the rapid growth of online service industries and growing customer demand.

The perceived trust of consumers in digital platforms and last-mile delivery services is also determined by the trust that the user has towards this type of business model, since ignorance and lack of experience influence the perception that these have of the correct functioning and efficiency of this form of commerce (Leon et al., 2021; Ray et al., 2020; Mladenow et al., 2016). The important relationship between last-mile logistics performance, performance expectancy, and user trust is revealed here. In turn, the technological tools that are used in order to improve the performance of the last mile have a positive impact on consumer confidence in the use of technology and logistics delivery processes, since they allow the consumer/user to be fully linked to each stage of the delivery and mainly to that last journey, called the last mile (Leon et al., 2021). In this way, today's consumers will increase their confidence in the technology used in the distribution of last-mile logistics, to the extent that its optimization is achieved through technological systems that guarantee security, offer the possibility of monitoring deliveries, rapid communication of problems and their timely resolution (Zhou et al., 2020).

H4- PE positively affects the UI of crowdsourced delivery platforms

The PE suggests that individuals evaluate the performance of their technology-mediated tasks in terms of the associated benefits (i.e., facilitation of efficiency, effectiveness, and productivity in performing the task) and costs (i.e.cognitive, behavioral, or financial investments made for special tasks) (Ahmad, 2019; Celik, 2019; Rahi, 2018). This means that if the cost is lower or the benefit is higher, the utility value of the technology will be higher and the intention to use it will be positive (p.394). "When users perceive that a

technology is useful and easy to use, then they will have a greater intention to adopt it" (Rahi et al., 2019, p. 413).

PE refers to the degree to which an individual believes that the use of a technology will provide benefits to users in carrying out certain activities (Venkatesh et al., 2012). Captures the construct of perceived utility in TAM. It is also parallel to extrinsic motivation in the motivational model of Davis et al. (1989) as a key predictor explaining the adoption and use of new IT by users (Venkatesh et al., 2003). A number of studies revealed that crowdsourcing performance is not only a matter of channel or medium, but also a matter of motivation. For example, Bott & Young (2012) considered the PE as a direct determinant of the crowdsourcing UI. In another study, Chong (2013) showed that PE is the strongest determinant of mobile app UI. A review of the literature of previous models indicates that PE has been considered at the individual level of users apart from the assessment as a crowd that participates in this type of platform (Yassen & Al Omoush, 2020).

H5- PT positively affects the UI of the Crowdsourcing platforms in the users.

The electronic trust perceived by consumers in the B2C e-commerce environment affects the safe conduct of transactions and the maintenance of the privacy of personal information, thus modifying their intention to use it (Leon et al., 2021). Although many new technology services are seen as inherently risky (Slade et al., 2015), previous technology acceptance models have overlooked perceived trust (Kapser, 2019; KoenigLewis et al., 2015).

Delivery companies can capture a large amount of user's personal and social information, such as information about family, relationships, political views, social activities, and religion, creating a wide range of potential risks, including the disclosure of private information and details, confidential information, identity theft, harassment, hacking,

blackmail and threats (Yassen & Al Omoush, 2020). "When it comes to any form of outsourcing tasks, including crowdsourcing, the risks are not trivial, especially for groups that are more distant geographically, culturally and intellectually (Yassen & Al Omoush, 2020, p.9)". According to Buecheler et al. (2010) with the hiring of crowdsourcing delivery services there are no predefined contracts between parties like those of traditional outsourcing, crowdsourcing is an extreme case of dealing with the unknown, where the individuals in the crowd are a priori unknown and the contingency plans for the unexpected behavior of this interacting mass cannot be fully prepared in advance.

H5a- PT has an indirect effect on UI mediated by PE.

In studies based on technology acceptance, researchers have shown that trust influenced perceived performance, which influenced behavioral intention (Sim et al., 2018; Leon et al., 2021; Slade et al., 2015). In other studies, researchers have also found that performance expectancy is related to perceived usefulness, and effort expectancy is related to perceived ease of use (Ahmad, 2019; Venkatesh et al., 2003). Regardless of the specific types of models, trust has been shown to have a direct positive impact on behavioral intention, which may be mediated by performance expectancy (Celik, 2016; Ching-Lung & Chuan-Chuan, 2015).

H6- PT has a positive effect on the PE of the users of the Crowdsourcing platforms.

Consumers tend to have more difficulty assessing the credibility of an online context from reviews and comments, as they are anonymous sources with no prior relationship with the recipient (Dong et al., 2019; Park et al., 2020). In this line, "the credibility of the information on the website will generate a positive perception in the minds of consumers that the website is useful" (Loureiro et al., 2018, p. 134), which increases the use cash of consumers' time for their tasks and purchases (Loureiro et al., 2018). It appears that there are

interrelationships between confidence, performance expectancy, and effort expectancy. Specifically, regarding the TUAUT, Sim et al. (2018) hypothesized that trust would be related to performance expectation and effort expectation, respectively. In another study, McLeod et al. (2008) showed that confidence in software logic and performance expectancy loaded on the same factor.

Trust is one of the most challenging concepts faced by customers who want to buy products or services online and the problem stems from the vulnerability website where the product is purchased (Slade et al., 2015). Leon et al. (2021) suggested that variables such as encryption, protection, verification, and authentication should be antecedents of perceived security, influencing consumers' perceived trust. Because most people are unaware if their information is being collected, recorded, and possibly later used for unintended purposes, they are becoming increasingly aware of how their information is used.

In addition, consumers are increasingly reluctant to provide confidential information on the web (Leon et al., 2021). Therefore, perceived security can be defined as the subjective probability in the eyes of the customer that their personal or financial information will not be displayed, saved and / or stolen during electronic commerce and storage by third parties (Flavian & Cuinaliu, 2006, p.604). Taking into account the perceived trust as a belief, attitude or expectation about the trustworthiness of another party, this trust perceived by the consumer is a determinant of the performance expectation on the use of websites (Myung-Ja et al., 2011).

Constructs in the context of crowdsourcing for last mile delivery

The interest on the part of both academics and businessmen about the factors that determine the acceptance and use of last-mile logistics models under the crowdsourcing format has increased in recent years (Leon et al., 2021; Ray et al., 2020; Bopage et al., 2020;

Castillo, 2018), leading the academic community to see the need to develop research that explains the specific acceptance factors of crowdsourced delivery services (Adapa et al., 2019; Lu et al., 2019). The constructs taken into account in the model were the product of the review of the published works in relation to the performance of last-mile logistics, the perceived trust, the performance expectation and the intention of use. Next in the Table 1

Table 1

Constructs, their elements and sources

Construct	Item	Adapted source
Last Mile Logistics Performance (LMLP)	LMLP 1: I think that these companies deliver in a timely manner.	(Esper, 2003; Harrington, 2016; Limet al., 2015)
	LMLP 2: I think that these companies deliver the product in good condition (not broken, damaged or faulty)	
	LMLP 3: I think these companies make use of efficient and scalable technology and delivery resources.	
	LMLP 4 I think that these companies make it easy to solve problems that may arise with the delivery.	
	LMLP 5: I think that these companies offer direct and fast online communication with the user	
	LMLP 6: I think that the user can know and track his order.	
Perceived Trust (PT)	PT1: I think that the companies that provide this type of service are reliable and have a good reputation	(Kapser, 2019; Liu et al, 2016; Leon et al. 2021)
	PT 2: I trust that they have the capacity to guarantee the privacy of user information.	
	PT 3: I trust the experience of their staff.	
	PT 4: I trust that they are capable of guaranteeing the physical integrity of their users/clients, at the time of delivery.	
	PT 5: I am confident that they ensure a safe delivery experience for the end user.	
Performance Expectation (PE)	PE1: I think they are useful for the delivery tasks of the products I buy.	(Ajzen y Fishbein, 1980; Ajzen, 1991; Davis, 1985; Venkatesh et al. 2012)
	PE2: I have the expectation that they allow to fulfill the delivery of purchases more efficiently.	
	PE3: I always hope they perform well.	
	PE4: I think they save time in the tasks of delivering the products I buy.	
	PE5: I expect they comply with what they offer.	
User Intention (UI)	UI1: I plan to contract this type of services for the delivery of retail products in the next six months.	(Ajzen y Fishbein, 1980; Ajzen, 1991; Davis, 1985; Venkatesh et al. 2012)
	UI2: I am totally convinced that I will use this type of platform in the near future.	
	UI3: I have contemplated making use of these platforms in the long term.	
	I have contemplated making use of these platforms in the long term	

Methodology

Characterization of the study population and data collection

The population under study in this research is made up of people who are aware of the crowdsourcing services in Ecuador from the three main cities: Guayaquil, Quito and Cuenca, because, according to the INEC, they are the cities with the largest population with a total of 6,142,302 inhabitants (see Table 2), in addition to having the most important economic activity, having the greatest access to the Internet and less illiteracy. Table 2 shows the population distribution of each of the cities contemplated for the data collection.

Table 2

Population size of people suitable for research

City	Population size	%
Quito	2,781,641	45%
Guayaquil	2,723,665	44%
Cuenca	636,996	10%
Total	6,142,302	100%

Note: Determination of the Population Size of the Three Most Populated Cities in Ecuador. Taken from "Projection of the Ecuadorian population, by calendar years, according to cantons 2010-2020" by the National Institute of Statistics and Censuses, 2020, retrieved from https://www.ecuadorencifras.gob.ec/proyecciones-poblacionales/.

To start the survey, a control question was asked about whether they know about platforms such as Glovo, Uber Eats, Orders Now, Tipti, selecting for the survey only those who answered affirmatively. The study sample in investigations using SEM should have at least 10 to 20 participants for each observable variable. In this investigation, 721 surveys were carried out.

Verification, validation and specification of the model

The validation of the questionnaire was carried out according to the procedure suggested by Yusof and Aspinwall (2000) who validated their research instrument through

the use of content, construct and criterion validity. This means that content validity is not determined numerically, rather it is a critical judgment of experts, in such a way as to guarantee the applicability of the resulting instrument for use in similar tests in the future. Construct validity seeks to analyze each construct or factor to verify the model matrix with the identity matrix, looking for convergent and discriminant validity (Stroessner, 2020).

In the case of content validity, it was developed through expert judgment, for which the assessment of the questionnaire questions was requested from three experts, whose lines of research are focused on Information and Communication Technologies and the area logistics and a translator to verify the translation from English to Spanish. As part of the criterion validity, a pilot test was carried out through a survey carried out by electronic means. Once the final version of the questionnaire was obtained, the Cronbach's Alpha test was applied to measure the reliability between the elements of the scale, with a result of .954, which demonstrates high reliability.

In total, 721 complete data were analyzed, taking a composition that was as equitable as possible in relation to the gender of the respondent and of legal age. The research instrument was validated through the use of content, construct and criterion validity. The confirmatory analysis was carried out by means of a Structural Equations Model (SEM), prior to which the convergent and discriminant validity analysis was carried out, using the Kaiser-Meyer-Olkin Measure (KMO) with a result of .967 and the Highly significant Bartlett sphericity of 0.000. As the normality hypothesis was not confirmed, the partial least squares structural equation model was applied, which is considered more flexible and applied as a non-parametric method (Martínez, 2018).

Results

Descriptive results

Table 3

Gender and age of respondents

Criteria	Characteristics	Percentage
Gender	Male	52%
	Female	47 %
	Not binary	1%
Age	18 - 29 years	73.50%
	30 - 39 years	19.40%
	40 - 49 years	5.70%
	50 - 59 years	1.00%
	60 + years	0.40%

In total, 721 complete data were analyzed, taking a composition that was as equitable as possible in relation to the gender of the respondent. In relation to age, a sample of people of legal age was considered, considering that the person has the legal capacity to contract services.

Model fit

To determine the fit of a good model, it is necessary to take into account several indices, since one alone is not enough to determine its validity. It is suggested to complement the Chi-square and the associated degrees of freedom with at least one absolute fit index as well as an incremental fit index. Hair et al. (2014) recommend complementing the Chi-square and degrees of freedom results with at least one absolute fit index as well as an incremental fit index. Therefore, model fit was assessed in terms of five commonly used measures: CMIN/DF (Normed Chi-square; $1.0 < \chi^2/df < 3.0$), Comparative Fit Index (CFI; ≥ 0.95) =0.976, Tucker-Lewis index (TLI; ≥ 0.95) =0.970 and the root mean square error of approximation (RMSEA; ≤ 0.05) = 0.044 and, Standardized Root Mean Square Residual

(SRMR ≤0.08) = 0.025. According to the proposed criteria, it can be observed as a result, the adjustment of the structural model was good.

Table 4

Model fit indices

	Standard	Result
X2		374.339
Df		155
CMIN/DF	Between 1 and 3	2.415
CFI	≥ 0.95	0.976
TLI	≥ 0.95	0.970
RMSEA	≤ 0.05	0.044
SRMR	≤ 0.08	0.025

Evaluation of the structural model and test of the research hypotheses

Figure 2 shows the results of the structured model. The model explained 0.67 of the variance in the intention to use last-mile logistics distribution companies under the crowdsourcing scheme. As shown in Table 4, most of the hypotheses were supported. Significant positive relationships were found between performance expectation and intention to use (confirming H4), perceived trust and intention to use (confirming H5), last-mile logistics performance, and performance expectation (confirming H2), last-mile logistics performance, and perceived trust (confirming H3). On the other hand, incidences of last-mile logistics performance and intention to use (rejecting H1) and perceived trust and intention to use (rejecting H5) were ruled out. Finally, the mediating relationships of perceived trust between the performance of last-mile logistics and the intention to use (H1a) are confirmed; as well as the mediating effect of perceived trust and intention to use through performance expectation (H5a).

Figure 2

Proven research model
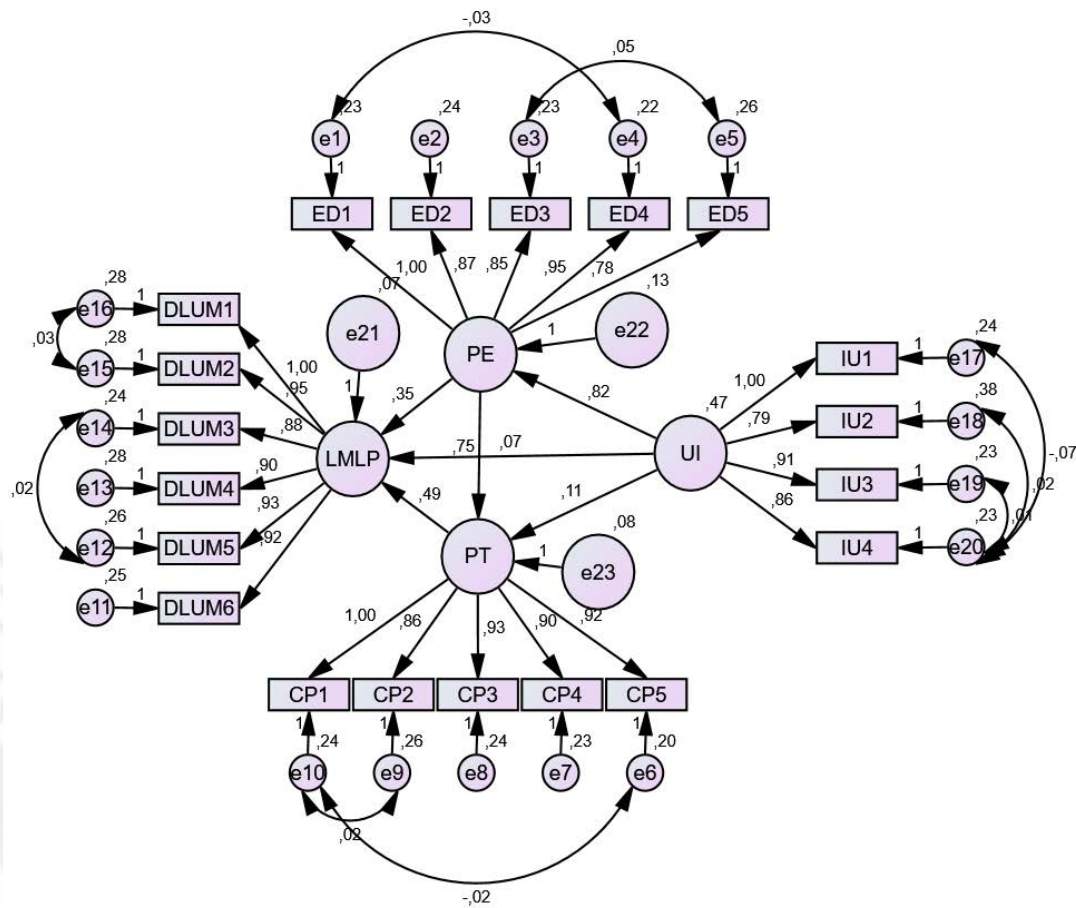
Table 5

Model coefficients and hypothesis testing

Hypothesis	Path Coefficient	β	P
H1	0.072	0.078	0.175
H2	0.35	0.368	***
H3	0.492	0.493	***
H4	0.822	0.844	***
H5	0.114	0.123	0.054
H6	0.748	0.787	***

Note. *** corresponds to value ($p = 0.000$)

  The results reveal that the performance of last-mile logistics has no effect on the
intention of end users or consumers to use logistics delivery crowdsourcing platforms, as well
as the perceived trust of the user. However, last-mile logistics have an effect on performance
expectation and perceived consumer confidence. On the other hand, the performance
expectation has an effect on the intention to use, just as the perceived trust has an impact on

the performance expectation. Finally, the standardized indirect effect of LMLP on UI, mediated by the PT, is 0.699, that is, due to the indirect (mediated) effect of LMLP on UI, when UI increases by 1 standard deviation, LMLP increases by 0.699 standard deviations; while the standardized indirect effect of PT in IU, mediated by PE is 0.664. Observe below the total, direct and indirect effects of each relation of variables of the model.

Table 6

Total (T), direct (D) and indirect (I) effects of the variables included in the model

Variables	2	3	4
(1) Last mile logistics performance (LMLP)	T=0.756 D=0.368 I=0.388	T=0.493 D=0.493 I=0.000	T=0.777 D=0.078 I=0.699
(2) Performance Expectancy (PE)		T=0.787 D=0.787 I=0.000	T=0.844 D=0.844 I=0.000
(3) Perceived Trust (PT)			T=0.728 D=0.123 I=0.664
(4) User Intention (UI)			

Discussion

Theoretical implications

The integration of logistics performance in the company's global strategy creates services and value for consumers (Harrington et al., 2016). Consumers seek to satisfy the need for delivery of products purchased through the Internet through efficient means that are capable of taking the product to the destination chosen by the customer in the shortest possible time and with the confidence of receiving the purchased product without damage (Barnett, 2005; Liu et al., 2016) or damage to physical integrity (Leon, 2021; Myung-Ja, 2010). However, this study rejects the idea that efficient delivery has effects on the end user's intention to contract the services of crowdsourcing platforms for the delivery of the products

they buy online; in the same way, perceived trust does not seem to have a direct effect on the final consumer's intention to use.

However, the results revealed an indirect relationship between last-mile logistics performance and intention to use through the mediating effect of perceived trust, just as PE has a mediating effect on the influence of PT on UI. At the individual level, Ecuadorian consumers stated that they buy their products on the internet when it is not possible to do so physically. Crowdsourced product delivery platforms in Ecuador provide an integrated and interactive alternative at relatively low cost.

At the crowd level, crowdsourcing supports collaboration and sharing of experiences to solve user problems, so the user expects good performance from service providers, including the efficiency of the delivery system. Thus, it can be evidenced that there is a mediating relationship of the PE in the UI, that is to say that when contracting this type of service, the consumer looks at the performance of the company providing the service in a holistic way without contemplating exclusively delivery efficiency.

Similarly, the indirect effect of the LMLP on the UI, mediated by the PT, is an indicator that the consumer will trust the provider company when contracting the service, which includes, in general terms, an efficient last-mile delivery. This can be observed empirically when comparing the results of this research with what was determined by Chevalier (2020) who points out that consumers in Ecuador who said they do not buy online do not do so due to the fear of being deceived or cheated or the fear of giving your personal information. Finally, the direct relationship between PE and UI was confirmed. This relationship is extensively supported in the literature (Ajzen & Fishbein, 1985; Ajzen, 1991; Davis, 1985; Venkatesh et al., 2012). In fact, Venkatesh et al. (2012) point out that performance expectation is the main driver of technology use intentions and behavior.

Managerial implications

Delivery service operators are looking to enter global operations through crowdsourcing. However, the markets have particularities that can complicate the expansion of operations (Ta & Esper, 2018). Many factors, specificities and characteristics influence the consumer in their decision-making process, purchasing habits, purchasing behavior, the brands they buy or the retailers they go to (Hallikainen et al., 2018). For managers, it is necessary to know the characteristics to be able to enter and position themselves successfully and having information about the consumer allows them to draw targeted strategies (Simons, 2014). The factors that determine the intent to use crowdsourced last-mile delivery platforms can be selected to manage the crowdsourcing strategy from the perspective of the end user.

Last-mile delivery companies can use the information available in this work to pre-design effective control strategies and corrective measures for each acceptance factor to promote crowdsourcing success. In addition, they must distinguish the dimension that is applicable to them and which dimension originates from other actors, for example if the performance of last-mile logistics in itself is not a determinant of the intention to use, but through the general performance of the entire system, then the companies that venture into crowdsourcing systems should focus their strategies towards the efficient operation of the system at a lower cost. In this sense, this research is a referent of consultation for entrepreneurs seeking to open operations in the South American market.

Limitations and future research

The findings of this research have several limitations. First, cultural factors were not addressed in the study. Despite what was expected, the good performance of last-mile delivery logistics did not turn out to be a determinant of the intention to use these platforms, therefore there must be other factors associated more directly with the intention to use that

may be associated with such cultural factors should be investigated mostly. Taking into account that culture is seen as a multilevel (i.e., national, organizational, and individual) and multifaceted (i.e., values, beliefs, artifacts, etc.) construct (Taras et al., 2009; Zhao & Khan, 2013), it is necessary to delve into the cultural factors that modify the intention to use retail delivery crowdsourcing platforms.

Another limitation regarding the sample is that it is made up of participants of various ages without stratification, therefore it is recommended to stratify the results to study the effects of the age of the participants on the intention to use and to assess whether there are differences between age groups. Third, there are many more internal factors that can affect the intention to use crowdsourcing platforms, such as user experience, ease of use, perceived control that were not considered in this research work. Finally, in this research, a survey was carried out in a general way to the end user, without contemplating differences in brands or commercial names, for which it is recommended to carry out an investigation that contemplates these differences.

Conclusion

The purpose of this study was to examine the effect that LMLP has on UI of retail product delivery crowdsourcing platforms and the mediating effect of PE and PT of users UI. It can be concluded that in the study sample, LMLP does not have a direct effect on the UI, but it does have an effect through PE and PT. Empirical evidence also reveals that UI is directly positively affected by PE, but not by PT, whose effect is reflected in UI through PE. Theoretical implications focus on understanding the importance that the end user gives to the efficiency of last-mile delivery and the perceived trust when deciding to hire crowdsourced delivery services, while understanding this decision through perceived performance of the entire business model. The practical implications are directed mostly at managers of

crowdsourced delivery businesses who can draw strategies focused on low costs taking into account that users are expecting good performance, without giving specific or particular importance to good delivery performance or trust you have in the company providing the service. Although this finding does not coincide with the referents of the literature, given that the good performance of logistics, as well as the perceived trust, are factors that generally determine the intention of use of consumers in more developed markets, in Ecuador it seems, the user will intend to use this type of platform as long as the delivery is fulfilled, no matter if it is fast or reliable.

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Chapter II. Conclusions and Recommendations

Conclusions

The findings of this research demonstrated that four of the six proposed hypotheses are statistically significant. It was found a statistically significant positive relationship between last mile logistics performance and performance expectancy, with a p-value <0.001, which fills the empirical gap that was identified in the literature review of this study. Therefore, hypothesis two (H2) was accepted. This finding is supported by the research carried out by Guo et al. (2019), Zhou et al. (2020), and Zhong et al. (2021) on relating "last mile" delivery service as a major challenge of logistics service performance. The results also revealed that the positive relationship between last mile logistics performance and perceived trust is statistically significant, with a p-value <0.001, validating hypothesis three (H3). Similar results were obtained by Liu et al. (2016a) and Liu et al. (2016b) in China.

Likewise, there is a positive statistically significant impact of performance expectancy on user's intention to use crowdsourced delivery platforms, which leads to the acceptance of hypothesis four (H4). This finding is consistent with other research that has presented the same result, showing that individuals evaluate the performance of their technology-mediated tasks in terms of the associated benefits and costs (Ahmad, 2019; Celik, 2019; Chua, 2017; Rahi, 2018). Additionally, when users perceive that a technology is useful and easy to use, then they will have a greater intention to adopt it (Rahi et al., 2019).

Similar relationship was found between perceived trust and intention to use crowdsourcing delivery platforms with a p-value <0.001, which confirms the hypothesis five (H5). This result is consistent with Leon et al. (2021) who found that trust perceived by consumers in the B2C e-commerce environment affects the safe conduct of transactions and the maintenance of the privacy of personal information, thus modifying their intention to use

it. Furthermore, Buecheler et al. (2010) stated that with the hiring of crowdsourcing delivery services there are no predefined contracts, therefore crowdsourcing is an extreme case of dealing with the unknown. The positive effect of perceived trust on performance expectancy was, as well, corroborated, which confirms hypothesis six (H6). This result stands the point that "the credibility of the information on the website will generate a positive perception in the minds of consumers that the website is useful" (Loureiro et al., 2018, p. 134).

However, this study rejects the idea that last mile logistics performance has effects on the end user's intention to contract the services of crowdsourcing platforms for the delivery of the products they buy online (H1); in the same way, perceived trust does not seem to have a direct effect on the final consumer's intention to use (H5). Finally, the standardized indirect effect of last mile logistics performance on user intention, mediated by the perceived trust, is 0.699, that is, due to the indirect (mediated) effect of last mile logistics performance on user intention; while the standardized indirect effect of PT in IU, mediated by PE is 0.664.

The link between these constructs had not previously been tested empirically.

Implications

The main theoretical implication arises from the rejection of the relationship between last mile logistics performance and user intention to hire crowdsourced delivery services. The literature states that consumers seek to satisfy the need for delivery of products purchased through the Internet through efficient means that are capable of taking the product to the destination chosen by the customer in the shortest possible time and with the confidence of receiving the purchased product without damage (Barnett, 2005; Liu et al., 2016) or damage to physical integrity (Leon, 2021; Myung-Ja, 2010). However, this factor does not seem to be mandatory in Ecuador markets. In the same way, perceived trust does not seem to have a direct effect on the final consumer's intention to use.

The results revealed an indirect relationship between last mile logistics performance and intention to use through the mediating effect of perceived trust, just as performance expectancy has a mediating effect on the influence of perceived trust on user intention, whose relationship had not been tested before. At the individual level, Ecuadorian consumers buy their products on the internet when it is not possible to do so physically.

At the crowd level, crowdsourcing supports collaboration and sharing of experiences to solve user problems, so the user expects good performance from service providers, including the efficiency of the delivery system. Thus, it can be evidenced that there is a mediating relationship of the PE in the UI, that is to say that when contracting this type of service, the consumer looks at the performance of the company providing the service in a holistic way without contemplating exclusively delivery efficiency.

Similarly, the indirect effect of the last mile logistics performance on the user intention, mediated by the perceived trust, is an indicator that the consumer will trust the provider company when contracting the service, which includes an efficient last-mile delivery. This can be observed empirically when comparing the results of this research with what was determined by Chevalier (2020) who points out that consumers in Ecuador who said they do not buy online do not do so due to the fear of being deceived or cheated or the fear of giving your personal information. Finally, the direct relationship between performance expectancy and user intention was confirmed. This relationship is extensively supported in the literature (Ajzen & Fishbein, 1985; Ajzen, 1991; Davis, 1985; Venkatesh et al., 2012). In fact, Venkatesh et al. 2012 point out that performance expectation is the main driver of technology use intentions and behavior.

The Managerial implications of this work is specially aimed to those operators that are looking to enter global operations through crowdsourcing. For managers, it is necessary to

know the characteristics to be able to enter and position themselves successfully and having information about the consumer allows them to draw targeted strategies (Simons, 2014). The factors that determine the intent to use crowdsourced last-mile delivery platforms can be selected to manage the crowdsourcing strategy from the perspective of the end user.

Last-mile delivery companies can use the information available in this work to pre-design effective control strategies and corrective measures for each acceptance factor to promote crowdsourcing success. If the performance of last-mile logistics itself is not a determinant of the intention to use, but through the general performance of the entire system, then the companies that venture into crowdsourcing systems should focus their strategies towards the efficient operation of the system at a lower cost. In this sense, this research is a referent of consultation for entrepreneurs seeking to open operations in the South American market, especially in Ecuador.

Recommendations

Despite what was expected, the good performance of last-mile delivery logistics did not turn out to be a determinant of the intention to use these platforms, therefore there must be other factors associated more directly with the intention to use that may be associated with such cultural factors should be investigated mostly. Taking into account that culture is seen as a multilevel (i.e., national, organizational, and individual) and multifaceted (i.e., values, beliefs, artifacts, etc.) construct (Taras et al., 2009; Zhao & Khan, 2013), it is necessary to delve into the cultural factors that modify the intention to use retail delivery crowdsourcing platforms.

It is also recommended to stratify the results to study the effects of the age of the participants on the intention to use and to assess whether there are differences between age groups. Third, to study a model with more internal factors that can affect the intention to use

crowdsourcing platforms, such as user experience, ease of use, perceived control that were not considered in this research work. Finally, to run out a research that contemplates the effect of brands or commercial names.

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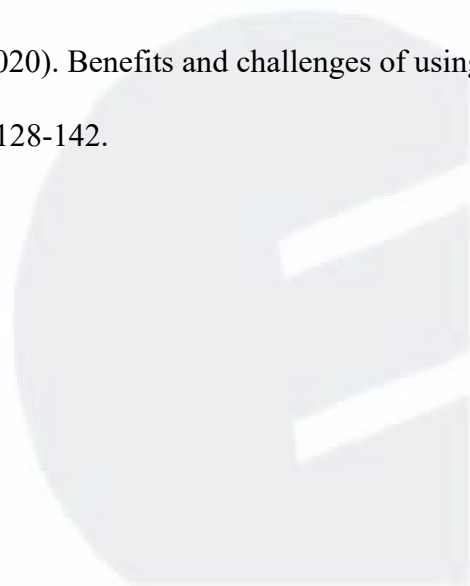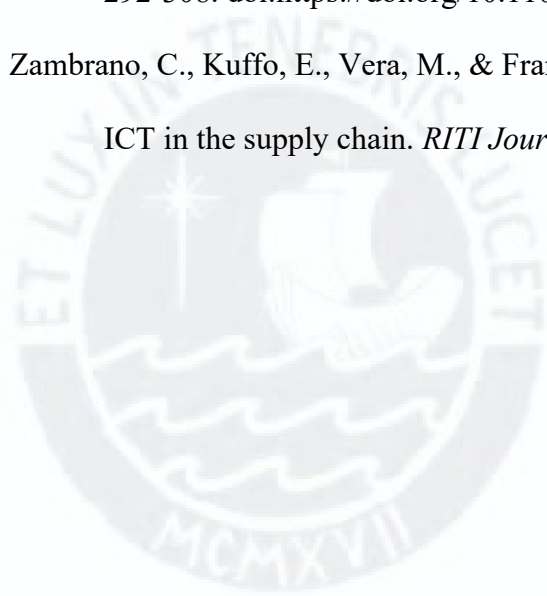
Appendices

Appendix A: Demographic Data Collection Instrument

First Section (Respondent Profile)

1. **1. City where you live**

   1= Quito

   2= Guayaquil

   3= Cuenca

2. **Sex**

   1= man

   2= woman

3. **Age**

   _____

4. **How often do you use the internet?**

   a. Never

   b. One hour a day

   c. more than an hour a day

   d. Six or more hours a day

5. **How do you feel about using the internet?**

   a. I use it because I have to, I prefer to use it as little as possible.

b. I use it when I can, I prefer to use it when I have nothing else to do.

c. I don't care if I use it or not use it.

d. I use it often, I like to use the internet.

e. I use it for everything, I like to use the internet.

6. **Do you know about collaborative use platforms (crowdsourcing) such as Uber, Glovo, Rapid, among others?**

1= Yes

2=No

7. **How do you feel about the use of Internet applications to make purchases of consumer products?**

a. I have no will at all. I would rather not do it.

b. I have a partial will, I prefer to use it when I have no other choice.

c. I don't care if I use it or not use it.

d. I use it often, I make some purchases through it.

e. I always use it, I like to use the internet to make my purchases.

Appendix B: Data collection instrument. Third Section (Specific questions to the factors)

1. **(DLUM). Regarding collaborative delivery logistics platforms such as Rappi, Glovo, Uber Eats or similar, I think that:**

	Questions	Completely disagree	Partially in disagreement	Indifferent	Quite agree	Completely agree
a.	These companies deliver in reasonable time.	1	2	3	4	5
b.	These companies deliver the product in good condition (not broken, damaged or faulty).	1	2	3	4	5
c.	These companies make use of efficient and scalable technology and delivery resources.	1	2	3	4	5
d.	These companies provide the ease of solving problems that may arise with the delivery.	1	2	3	4	5
e.	These companies offer direct and fast online communication with the user when making the delivery	1	2	3	4	5
f.	The user can know and track his order.	1	2	3	4	5

2. **(CP). In general, regarding the use of these platforms I trust that:**

	Questions	Completely disagree	Partially in disagreement	Indifferent	Quite agree	Completely agree
a.	Companies that provide these types of services are reliable and have a good reputation.	1	2	3	4	5
b.	They have the ability to ensure the privacy of user information.	1	2	3	4	5
c.	They have experienced staff.	1	2	3	4	5

	Questions	Completely disagree	Partially in disagreement	Indifferent	Quite agree	Completely agree
d.	They are capable of guaranteeing the physical integrity of their users/clients, at the time of delivery.	1	2	3	4	5
e.	They guarantee a safe delivery experience for the end user.	1	2	3	4	5

3. (ED). In general, regarding buying through these platforms for collaborative use, I hope that:

	Questions	Completely disagree	Partially in disagreement	Indifferent	Quite agree	Completely agree
a.	Be useful for the delivery tasks of the products I buy.	1	2	3	4	5
b.	Allow to fulfill the delivery of purchases more efficiently.	1	2	3	4	5
c.	Have a good performance.	1	2	3	4	5
d.	They save me time in the delivery of the products I buy.	1	2	3	4	5
e.	Comply with what they offer.	1	2	3	4	5

4. (IU) During the current year:

	Questions	Completely disagree	Partially in disagreement	Indifferent	Quite agree	Completely agree
a.	I intend to use applications such as GLOVO, RAPPI, UBER EATS.	1	2	3	4	5
b.	I plan to contract this type of services for the delivery of retail products in the next six months.	1	2	3	4	5
d.	I am totally determined to contract this type of services in the near future.	1	2	3	4	5

	Questions	Completely disagree	Partially in disagreement	Indifferent	Quite agree	Completely agree
e.	I have contemplated making use of these types of platforms in the long run.	1	2	3	4	5

Appendix C: Acceptance letter of the research article

TRANSPORTATION RESEARCH INTERDISCIPLINARY PERSPECTIVES

To: CENTRUM Catolica Graduate Business School, Pontificia Universidad Catolica del

Peru, Lima, Peru.

Karl Kim, PhD

Dears Authors: *Wilson Guerra and Ruben Guevara.*

24/08/2022

Reference: EPR-1004FR2

Acceptance Letter

We would like to inform you that your paper titled *"Direct and indirect effect of Last Mile Logistics Performance on user intention of crowdsourced delivery services."* has been accepted for publication in **Transportation Research Interdisciplinary Perspectives ISSN 25901982**, current issue of 2022 based on the Recommendation of the Editorial Board after previous corrections made by the authors.

This letter is the official confirmation of acceptance of your research paper. Your research paper will be appearing in the **Volume 16 December 2022** of International Journal of Production Economics. Kindly acknowledge the Paper acceptance.

Thank you.

Yours Sincerely,

Karl Kim, PhD
University of Hawaii at Mānoa, Honolulu, Hawaii, United States of America

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