

Article

Measuring E-Commerce User Experience in the Last-Mile Delivery

Vijoleta Vrhovac ¹, Stana Vasić ^{1,*} , Stevan Milisavljević ¹, Branislav Dudić ^{2,3,*} , Peter Štarchoň ² 
and Marina Žižakov ¹¹ Faculty of Technical Sciences, University of Novi Sad, 21000 Novi Sad, Serbia² Faculty of Management, Comenius University Bratislava, 82005 Bratislava, Slovakia³ Faculty of Economics and Engineering Management, University Business Academy, 21000 Novi Sad, Serbia

* Correspondence: vasic.stana@uns.ac.rs (S.V.); branislav.dudic@fm.uniba.sk (B.D.)

Abstract: This research aims to develop and to examine a measurement of customers' experiences in the last-mile delivery process, which is a critical step towards their satisfaction and future intention to order products from the same retailer again. The CMX-LMD scale is proposed as a self-report tool whose psychometric properties were then examined. The total sample of $N = 907$ participants (63.4% females) was randomly split into two subsamples, then EFA and CFA were conducted, followed by item and correlation analysis. Six factors were revealed (Delivery efficiency, Parcel tracking, Smooth delivery, Visual appeal, Joyful anticipation, and Convenience), explaining about 60% of the total variance. The structure was supported by CFA ($\chi^2(237) = 584.71, p < 0.001, CFI = 0.941, TLI = 0.932, RMSEA = 0.057, SRMR = 0.058$). The relations of the derived scales and other variables, such as trust in courier services, were also examined. The CDX-LMD offers acceptable properties and provides a useful measurement for researchers and practitioners in the cross-section between e-commerce and logistics.

Keywords: last-mile delivery; delivery; customer satisfaction; customer experience; logistics; e-commerce

MSC: 91B74; 91B60



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1. Introduction

Academic interest in the area of last-mile logistics has significantly increased. The significant growth is based on increasing urbanization and population growth, e-commerce development, changing consumer behavior, innovation, and growing attention to sustainability [1–4]. Last-mile logistics represents planning, implementing, and controlling efficient and effective transportation and storage, from the order penetration point to the final customer [5]. Last-mile delivery is an important phase in the supply chain. Thus, it tends to be operational and refers to all logistics activities related to the delivery, from the transportation origins to the final destinations. It can also be described as the front end, where the last-mile meets the receiver [6]. Urbanization and e-commerce are the main factors of the increasing demand for the last-mile delivery services, as more and more people move into urban areas. Furthermore, e-commerce is showing steady growth. The level of geographic concentration and online orders per person is leading to a steady increase in the parcel volumes to be handled [7]. Additionally, by increasing e-commerce activities, parcel volumes are increasing as well. A high number of online retailers have made next- or even same-day deliveries mandatory, as one of their services. In this context, the last-mile deliveries are facing time pressure and tight deadlines. As online deliveries vary over the week and the year as well (seasonal sales), the last-mile deliveries face strongly varying workloads. With this being said, the last-mile concepts are required to be easily scalable on short notice [7]. Furthermore, a physically demanding environment such as parcel delivery,

which often includes harsh occupational conditions and low payments, causes a problem for employers in hiring the required manpower.

The e-commerce industry has grown exponentially in the last few years. In this context, the volume of e-commerce transactions is also showing significant growth [8]. The rapid growth of e-commerce has enabled retailers to reach as many customers as possible [9]. In the past two years, facing the global health crisis of COVID-19, consumers worldwide have resorted to online shopping for their daily and general needs [10]. Many companies have enabled their customers to obtain the products they need with a few “clicks”, which suggests that electronic commerce arose through the need to buy and sell goods, products, or services via the Internet. The number of consumers who buy online is on a steady upwards trajectory. That shift in the consumer behavior and the massive growth of e-commerce has led to disruptions in the supply chains and increased pressure on last-mile delivery [11], as consumers increasingly shop online and prefer their homes for delivery compared to other delivery solutions [10].

Following the increase in online shopping, we see the importance of package delivery in the 21st century. Thus, we can conclude that last-mile delivery occupies an increasingly important place in the supply chain, followed by numerous challenges that will become even greater. Last-mile delivery refers to the last step of the delivery process when the package is moved from the transport hub to the final destination [12,13], and is a crucial part of the logistics service process because it directly contacts customers and affects customer satisfaction [14]. Recent research shows that experience in the last-mile delivery process plays a vital role in the user experience of online shopping [15].

The role of last-mile delivery implies the complexity of managing the flood of parcels in cities, along with the demands for and complexity of omnichannel retailing. The last-mile delivery process involves different stakeholders, such as consumers, logistics providers, and retailers [16]. The last-mile delivery concept presents a chain of storage and transport process steps. Each chain starts at the depot and ends with a handover element. The process chain consists of one or multiple transport and storage process steps moving the shipments closer to the customer [17].

Customer experience in the last-mile delivery process can be a key factor in a customer’s decision to return to the same retailer or brand. Customers are increasingly looking for reliable delivery, as well as flexibility in choosing the time and place of delivery [18]. For this reason, retailers and logistics service providers (courier services) need to focus on providing an efficient and quality experience in the last-mile delivery process to meet customer needs and maintain competitiveness [19]. In addition, the user experience in the product delivery process plays a key role in increasing the user satisfaction. A positive experience in this process can lead to customer loyalty, positive reviews, and recommendations, which can influence sales and revenue growth [20]. On the other hand, a negative experience in the product delivery process can lead to a loss of customer trust, negative reviews, and reduced sales. To improve the customer experience in the last-mile delivery process, retailers and logistics service providers can implement various strategies, such as providing accurate information about the delivery status, flexibility in choosing the time and place of delivery, the ability to track the shipment in real time, and the ease of product collection [5,21]. It is essential to focus on customer needs and provide a high level of service to achieve a positive customer experience and increase customer satisfaction. User experience is crucial for the long-term success of any business, since satisfied users form the foundation of a successful business [18–20].

Conducting customer experience research in the product delivery process is important because it allows us to find out how satisfied customers are with the delivery process and how willing they are to use it in the future. This research can help e-tailers and logistics service providers to improve their processes and increase the level of customer satisfaction and loyalty toward their services. Overall, researching the user experience in the product delivery process is needed for understanding the wants and needs of users, improving the delivery process, and increasing the level of user satisfaction.

User experience with the last-mile delivery is a relatively new and under-researched aspect in the field of logistics and e-commerce. Although several studies have addressed this topic, there are still numerous gaps in the user experience of product delivery. One of the gaps is the lack of adequate instruments to measure this experience. Therefore, our contribution to this research is that we tried to create an instrument for measuring the user experience in the product delivery process. The creation of this instrument will also enable comparative analysis between different user experiences in the last-mile delivery process, which can be of key importance for the improvement of existing services in practice in this area.

In this paper, the intention was to design and test a self-reported measuring scale to assess online shoppers' experience during the last-mile delivery (LMD), based on Lemon's [22] and Olsson's [5] model of customer experience. According to the findings of Lemon and Olsson, the overall customer experience comprises six different dimensions, i.e., responses that an individual can have to the service. The dimensions are cognitive, emotional, behavioral, sensorial, physical, and social responses. The authors suggest that the dimensions are interrelated, but the relations have not been examined quantitatively. The aim was to construct a practical instrument that the online vendors and logistics companies could utilize to measure their end users' experience in this critical process. In previous research conducted by Ejodus and Gulz [23], it was established that there is a connection between the trust in courier service and other aspects. Therefore, we introduced the connection of trust in the courier service with other aspects of the proposed measuring instrument. With this approach, we expected to obtain a more comprehensive picture of the relationship between the trust in the courier service and other aspects of the measuring instrument. The research goal was to develop a new measuring instrument for user experience in the last-mile delivery process that we can apply for research in the territory of the Republic of Serbia.

2. Literature Review

2.1. E-Commerce and Last Mile Delivery

E-commerce is a form of business that is increasingly used nowadays due to the growing popularity of the Internet and digital commerce [24].

"Since the last decades e-commerce has become an increasingly important source of competitive advantages. The opportunities of e-commerce enforce managers to redesign business processes and even to rethink the existing business models and the relationships with their business partners" [24].

We see that e-commerce in the last decade has changed the way they do business in terms of optimizing their business processes and reducing costs, which can be key to their competitive advantage. From the aspect of logistics, the rapid growth of e-commerce has led to awareness of the importance of logistics in every process of electronic commerce. E-commerce is a set of activities that take place on the Internet and that rely heavily on efficient logistics [25]. The logistics of goods delivery has become very important for e-commerce in the last decade and especially during the pandemic when the adoption of this way of shopping increased [26]. Here are the three main stages of delivery logistics: from the manufacturer to the distribution center, in the distribution center, and from the distribution center to the end user [27]. The last-mile delivery refers to the stage of delivery from the distribution center to the end user.

E-commerce plays a significant role in the last-mile delivery. This is because e-commerce makes it easy to order and pay for goods online, which reduces the need to physically visit the store [7,28]. Additionally, e-commerce allows for tracking of the shipments and gives customers more information about expected delivery times, which can reduce frustrations with delivery delays or problems. On the other hand, e-commerce allows sellers to better manage their inventory and deliveries, thereby reducing the time it takes to deliver goods to customers [29]. Therefore, e-commerce can improve the efficiency of the last-mile delivery process and reduce costs for sellers [30].

Last-mile delivery represents the final step in the delivery process when the package is transferred from the transport hub to the end user, whether it is a home address, workplace, or another place that is selected for the product delivery [12,18]. This step is considered the most challenging, expensive, and inefficient part of the logistics process, as it involves multiple factors such as delivery to different addresses, meeting different customer requirements, and requirements for efficient delivery [2,6,15]. In recent years, the last-mile delivery has become an important factor in the success of online shopping, considering that more and more people are choosing to shop online. Therefore, more and more companies are investing efforts to optimize this step, to ensure fast and efficient delivery that leads to customer satisfaction, as research shows that the experience of the end users and their satisfaction in the last-mile delivery process play an important role in the overall customer experience of online shopping [12,15,31].

We can see from the literature review how last-mile delivery is becoming increasingly important when it comes to delivering products and creating a positive customer experience. Speed, accuracy, and efficiency of delivery are key factors for creating users' positive perception towards a product/service [9]. Although it is considered the most expensive part of the supply chain [18], some research shows that it is where the most value is created for customers [12]. For this reason, e-tailers and logistics service providers strive to find ways to effectively deal with the challenges that rise in the last-mile and to meet the needs and expectations of the end users. Scientific works in this field deal with issues such as the efficiency and effectiveness of the last-mile delivery, optimization of logistics processes, improvement of customer experience, management of resources, including human, information, and material resources, as well as the development of new technologies that can help solve challenges in the last-mile delivery process [10,14,30,32,33]. In the previous part, we saw the importance of e-commerce and logistics providers in the process of product delivery, and the question arises as to how e-commerce and logistics service providers can improve their business.

“As service organisations identify collaborative e-marketplaces as strategic business approaches, they can embrace the ultimate form of competition enabled by the internet” [34].

Some authors [34] believe that with e-market platforms, e-traders and logistics providers can improve their product delivery process in several ways. For example, by sharing information about the customers and orders, it is possible to better plan the deliveries and reduce logistics costs. Moreover, by using this type of platform, e-tailers and logistics providers can have access to a wider market and more customers, leading to higher revenues and better business results. This approach to business enables greater competitiveness for all business participants, which motivates them to constantly improve their business and offer to remain relevant in the market [24,34]. Taking into consideration the role of rapid digitization development in enriching the hierarchy of the capital market, constant improvement is crucial for e-traders and logistics providers [35].

2.2. Trust in Service

Long-term loyalty, as well as client feedback, are of great importance for delivery services. Considering the challenges faced through building successful client relationships based on trust, this process is time-consuming but at the same time crucial for modern organizations, especially service ones. Furthermore, the dual interaction between service providers and their clients is also an important factor to consider. These dualistic ties are reinforced by trust, which is comprised of cognitive, affective, and intentional components. Characteristics of trust can be summed up to the following: honesty, reliability, fulfillment, competence, quality, credibility, and benevolence [36]. Trust can be defined as the main driver of customers' continuance intention, as it is the foundation of a relationship [37–41]. In the goal of customers feeling safe while sharing their personal information and having the willingness to make themselves vulnerable, trust carries an important role. Moreover, an assessment of trustworthiness is inevitable when evaluating the service provider. The

level of trust should be rising throughout the service interaction, while the client is gaining confidence and positive mutual feelings such as commitment and loyalty [42].

The relationship between trust and the quality of service is two-way. To increase customer trust, a service provider should make an effort to reduce the perceived uncertainties and risk, while, on the other hand, when customers trust the solutions ordered by a service provider, their assessment of the service quality is higher [23]. The need for trust arises in any supplier/client business relationship characterized by a high degree of risk, thus, customers need to trust their service provider to deliver the desired service outcome. Personal qualities such as politeness and an empathetic attitude should reduce interpersonally barriers and, thereby, contribute toward the establishment of trust [43]. Customers rely on service providers and delivery personnel to deliver the ordered or purchased items undamaged and on time, just as the delivery personnel expects that a recipient will be available during the delivery period [44].

Taking into consideration the increased vulnerability of online consumers' transaction risks, trust in an e-commerce environment is imperative [40]. Research shows that the literature on user continuance in the online environment and the finance industry has highlighted the role of trust [41,45,46]. Trust promotes interactions between customers and service providers. When the service provider is regarded as trustworthy by customers, the relationship continues to grow and develop [47]. Trust has an important influence on loyalty and positive word-of-mouth as a set of beliefs about competence and integrity. With this being said, relationships between customers and providers are determined by trust. Trust can be the driving force of customer commitment, therefore, through a trust-based relationship, loyalty is being built [48]. Trust develops over time, and it is an essential ingredient for creating satisfied and loyal customers in e-commerce, leading to higher levels of trust, which influences long-term relationships. Customers most often perceive online retailers as riskier than traditional retailers. Therefore, customers prefer to buy from online retailers they can trust. Trust has an important role for customers in moving from feelings to beliefs. The process of building trust is complex and different for every individual [49].

Throughout the literature review, we see that achieving customer satisfaction, through trust and positive experiences, is essential [50]. Trust significantly influences the satisfaction in home-delivery services [48]. Moreover, trust has a positive and significant relationship with satisfaction [51]. Trust can be defined as a mutual dependence between two parties, meaning, it can be a decisive factor in ascertaining customers' engagement in e-commerce [52]. Expectations when waiting for their packages and experiences when they are delivered to the customers are always in comparison. The delivery experience depends mostly on the quality of the service and the level of trust the online buyers have in the delivery personnel. If the experience exceeds expectations, customers will be beyond satisfied. Furthermore, if the delivery personnel is able to build trust with the online purchasers, this will result in developing long-term relationships with customers [44].

Developed through interaction in practical forms, trust is needed for success in any industry [53]. Trust needs to be taken care of and tested over time once it is established.

2.3. User Experience and User Satisfaction

Competition in the service sector is constantly increasing. Companies recognize the needs of their customers and ensuring customer satisfaction with the services they receive is becoming of extraordinary importance. Customer satisfaction is crucial for all logistics providers who want a competitive advantage in the market. Further, if they do not meet customer expectations, their position in the market will be taken over by companies focused on meeting customer expectations [54]. The rapid growth of online shopping in recent years has highlighted the importance of home delivery services provided by package delivery personnel in ensuring customer satisfaction. Home delivery service is an opportunity to see customized, convenient, and efficient service as an opportunity to build long-term customer relationships, gain a competitive advantage and increase customer satisfaction.

On-time delivery, better service, positive perceived customer value, and trust in service providers (logistics providers) contribute to customer satisfaction [44].

Most authors [12,20,21] agree that the user experience in last-mile delivery affects user satisfaction in the entire online shopping process. Ref. [23] state in their work that many researchers have identified trust as one of the key factors of e-user satisfaction. In the context of e-users' satisfaction in the last-mile delivery process, the package distribution to the user requires fast transport with the shortest possible delivery time to meet the user's expectations in terms of delivery speed. Customers' trust is gained in the participating companies in the last-mile delivery process, which is also confirmed by [12] when he states that e-users are very demanding in terms of the accuracy and speed of delivery. Moreover, [33] concludes that customers value speed and accuracy of delivery. Users expect convenience and do not want to deal with package delivery problems (delivery delays, wrong products, lost packages). When the delivery process, i.e., the product delivery process, meets the user's expectations, we have a positive user experience that affects the loyalty and satisfaction of the user [54,55].

The quality of the delivery service affects the success of all e-commerce participants and impacts attracting e-customers [21]. One study [9] emphasizes the importance of user experience in the delivery process and states that the user experience becomes a source for gaining a competitive advantage in the electronic market. Ref. [5] explains that customer satisfaction can be seen as a consequence of the customer experience along the entire purchase journey, in which multiple touch points are associated with the delivery service in the online shopping process. Ref. [9] in their study define the e-customer journey in three stages: online experience, delivery experience, and product return service. Another study [5] defines these stages as the pre-purchase stage, purchase stage, and post-purchase stage. The level of customer satisfaction can vary between the online retail stage and the post-shipment stage. The customer satisfaction level can be very high in the online retail stage. After the delivery stage, if the customer is not satisfied with the delivery process, the level of satisfaction drops significantly, which confirms the impact of the delivery service on the overall customer satisfaction [56]. Measuring user satisfaction in all stages of the purchase journey can affect the management of the user experience and, therefore, the overall satisfaction of e-users in the delivery of the last-mile [5].

The logistics service quality has a significant impact on the positive user experience in the delivery of the last-mile. Thus, there are authors [23,41,44,57] who deal with the quality of services of courier services (logistics providers) in their research, because they represent the last and key step in the online shopping process. The quality of services seen by users (trust, delivery time, mobile applications, ability to track the shipment, and contact with the delivery person) should be a key element in the process of creating sustainable services for logistics providers [23]. The power of users in the B2C electronic market is growing more and more [58]. New formats of logistics services for courier companies are increasingly dependent on users. Taking the preferences and needs of e-users into consideration in the logistics environment of electronic commerce is necessary [5].

3. Materials and Methods

3.1. Sample and Procedure

The questionnaire was distributed online, via Google Forms. A general introduction and instructions for the respondents were stated at the starting page of the survey, ensuring the respondents that their anonymity was guaranteed, informing them that their answers will not be observed separately from the other ones, allowing them to quit their participation at any time if desired without any need for an explanation, and providing them with an email address should they have any questions, concerns, or need to debrief after completion of the questionnaire. The data were collected over a three-week period, from November to December 2022.

A total of 907 responses were collected using two convenience sampling methods. First, through several ubiquitous social media channels and networks, asking potential

participants of legal age to engage in the online survey if they have had at least one experience in purchasing non-perishable goods online and having them delivered to a certain location (excluding online food ordering). Second, a number of undergraduate students at the Faculty of Technical Sciences, University of Novi Sad, Serbia asked to contact three persons of legal age they knew who have had at least one experience in purchasing non-perishable goods online and having them delivered to a certain location (excluding online food ordering) to participate in the online survey—at least two of the three persons were not a student themselves. Eight participants (0.8%) did not answer the question about their gender. However, among those who did, there were 63.4% females. The mean age of the total sample was $M_{age} = 34.90$ ($SD_{age} = 12.67$). Almost one third (32.6%) of the sample belonged to the 18–24 age category, followed by the 45–54 category (23.6%). A little more than one fifth (21.3%) of the participants were in the 25–34 age group, and 16.5% were in the 35–44 group. Finally, there were 5.95% participants in the group of 55 years of age or more. We found such age categorization relevant in the e-commerce context [59]. Additional sample characteristics are shown in Table 1.

Table 1. Demographic characteristic of the sample (N = 907).

Characteristic	Level	Frequency	%
Employment status	A person permanently employed by an employer	428	47.19
	Unemployed student	175	19.29
	Self-employed	95	10.47
	Occasional employment or fixed-term work	81	8.93
	Unemployed	64	7.06
	Employed student	46	5.07
	Pensioner, on disability or old-age pension	11	1.21
	Other	7	0.77
Education	High school	397	43.77
	University or college	343	37.82
	Master	118	13.01
	PhD	34	3.75
	Student	11	1.21
Monthly income	Primary school	4	0.44
	Between 100,000 and 200,000 RSD	267	29.44
	I don't want to say	229	25.25
	Between 50,000 and 100,000 RSD	207	22.82
	More than 200,000 RSD	126	13.89
Place of living	Up to 50,000 RSD	78	8.60
	Town/township	685	75.52
	Village	121	13.34
	Suburb	101	11.14

Students were also allowed to participate in the same survey themselves in addition to the three persons they recruited if they met the main criteria of having personal experience in online shopping and product delivery. Since this assignment accounted for only 2% of students' points in their courses and they had two weeks to complete this simple task, the risk of false data was considered low. This method allowed for a swift data collection process that gave access to a wide array of the general population [60].

3.2. Materials

3.2.1. Demographic Questions

Participants were asked about their gender, age, highest education level, employment status, monthly income, and the size of the place they live in.

3.2.2. Last-Mile Delivery (LMD) Items

We administered 58 items as indicators of the customer experience through the customer journey. The items were developed based on the previously proposed multidimensional construct of customer experience [22], and to generate a taxonomy for the

development of this instrument, the proposed LMD experience framework [5] was translated into keywords that conveyed specific personal experience. Based on these keywords, several first-person statements were derived for each of the hypothesized dimensions by two authors independently—approximately one-third of the items were negatively articulated to avoid answering bias [61]; these statements were then compared to produce a single pool of reconciled items which resulted in a list of 64 items; using a small pilot sample ($N = 8$) of naïve respondents to test comprehensibility, the scale was slightly edited and reduced to the definite number of fifty-eight items. Participants answered on a 5-point scale (1 = is not relevant at all, to 5 = relevant to a large extent). The final version of the questionnaire was distributed online to a pilot sample ($N = 20$) of naïve respondents to test the readability, comprehensibility, and usability of the complete instrument, which resulted in some comments and suggestions for improvement from these respondents. All questions are presented in Appendix A.

3.2.3. Way of Delivery Frequency

Three 4-point Likert scale items measured the frequency of the participants' use of three different ways of delivery, namely home pickup, workplace pickup, or pickup at the parcel machine. The answers could range from 1 = never to 4 = often.

3.2.4. Importance of Delivery Aspects

The participants rated how important the five aspects of delivery were on a 5-point Likert scale, where 5 meant great importance. Each item corresponded with a single aspect of delivery, which were: price, speed, the possibility of parcel tracking, the possibility of an address change, and the call of the courier before the delivery.

3.2.5. Preferred Way of Communication with the Courier

Participants could choose one of the three ways of communication with a courier, where the options were SMS, mobile phone apps (such as WhatsApp and Telegram), and email.

3.2.6. Most Important Aspects in Choosing an Online Vendor

One item measured how important the way of delivering is to participants when choosing an online shop, and the other measured the importance of the courier service that does the delivery. Both items were rated on a 5-point Likert scale (1 = it is not important to me, 5 = it is very important to me).

3.2.7. Trust in Courier Services

Six items assessed the trust in courier services. Participants indicated the extent the statements regarding the trust in courier services applied to them (from 1 = does not apply to me at all, to 7 = applies to me to a great extent). This scale was based on the subscale from Ejdus and Gulc [23]. The internal consistency of the scale in this study was $\alpha = 0.95$. See Appendix B for the questions.

3.3. Data Analysis

Exploratory factor analysis (EFA), with the maximum likelihood (ML) factoring method, was conducted on a randomly chosen portion of approximately 50% of the sample ($n = 453$), to identify the dimensions underlying the last-mile delivery, measured with 58 items. Scree diagram, Keiser-Guttman criterion, and parallel analysis were used to determine the number of factors, and factors were rotated using Varimax rotation. Loadings higher than 0.32 were considered acceptable.

Another half of the sample ($n = 454$) was used to check the obtained factor structure, using confirmatory factor analysis (CFA). Parameters were estimated using the ML method. The model fit was assessed using the comparative fit index (CFI), Tucker-Lewis index (TLI), root mean square error of approximation (RMSEA), and standardized root mean square

residual (SRMR). The fit was considered acceptable if the CFI and TLI > 0.90, and the RMSEA as well as SRMR < 0.08 [62].

Furthermore, the Pearson correlation coefficient was used to examine the relationships between the newly constructed scale we named Customer delivery experience—Last-mile delivery (CDX-LMD) and other variables, and a t-test was used to test the gender differences in each scale. The reliability of the scales was assessed using Cronbach's α and composite reliability (CR), and other item-related measures included squared multiple correlations (SMC) and corrected item-total correlation. Convergent and discriminant validity was assessed using average variance extracted (AVE) and inter-scale correlations. Gender differences in the obtained scales were examined using a t-test. Analyses were conducted using R programming language [63], using "rstatix" [64] "tidyverse" [65], "psych" [66], "lavaan" [67], "semTools" [68], and "semPlot" [69] packages. The data and R analysis code are available upon request from the first author.

4. Results

4.1. Exploratory Factor Analysis

The Kaiser–Mayer–Olkin coefficient and Bartlett's sphericity test suggested that the data were appropriate for factor analysis, $KMO = 0.93$, Bartlett's $\chi^2(1653) = 16512.69$, $p < 0.001$. The Kaiser-Guttman criterion and parallel analysis indicated that eight factors should be retained. However, according to the scree diagram, five to eight factors should be retained. Furthermore, after a thorough inspection of the pattern matrix and meaning of the extracted factors, removing loadings < 0.32 and cross-loadings (except one), it was concluded that two factors should be removed, leaving six factors (24 items), explaining approximately 60% of the variance. The retained factors were named and interpreted as follows: Delivery efficiency—high preference for the efficiency and professionalism of the courier services and e-tailers; Parcel tracking—the behavior of actively tracking the ordered item; Smooth delivery—the experience of a smooth interaction while receiving a parcel; Visual appeal—the importance of visual appeal of the courier company as well as the packaging; Joyful anticipation—the feeling of joy related to the anticipation and reception of a parcel; and Convenience—the belief of usefulness and convenience of online shopping over classical visiting of the store. A pattern matrix of the six-factor solution is shown in Table 2 (We emphasize that we also tried an eight-factor solution with the factors of unpleasant emotion and skeptical perspective. However, we believe those two factors are not part of the usual user experience but refer to situations when the delivery process does not go according to plan. Thus, we decided to leave it at six factors).

Six factors explained 60% of the total variance. Item 19 was the only one with a cross-loading, however, the loading on the first factor was much lower than on the fifth. Items 50 and 24 had the lowest communality of all, while items 11 and 10 had the highest communality.

4.2. Confirmatory Factor Analysis

Results of the CFA, performed on the other half of the random subsample, showed an acceptable global fit of the six-factor model. The Chi-square was significant, $\chi^2(237) = 584.71$, $p < 0.001$. However, this almost always happens due to the large sample size. Other fit indices were CFI = 0.941, TLI = 0.932, RMSEA = 0.057, and SRMR = 0.058. The standardized loadings with factor correlations are shown in Figure 1. All loadings were statistically significant.

Items with lower loadings were items 50, 26, and 39, on Delivery efficiency, and item 48 on Smooth delivery. However, all loadings were greater than 0.50.

4.3. Item Analysis

The only gender difference was detected in Joyful anticipation, with females achieving higher average scores. The psychometric properties of the scales are presented in Table 3. All scales showed good reliability, in the form of Cronbach's α and CR. There was

some evidence for the convergent validity of all scales, except for Delivery efficiency and Smooth delivery since their AVE values were <0.50. However, they had all standardized loadings > 0.50. The discriminant validity of all scales could be established since all squared AVE values of each scale were greater than their correlations with other scales. AVE and CR were calculated from the CFA loadings.

Table 2. Pattern matrix of the six-factor solution in EFA (*n* = 453).

Item	Content	Factor						h2
		1	2	3	4	5	6	
30	I am happy to order goods from vendors with whom I have no problems with former deliveries.	0.75						0.64
44	I will often buy from those with whom my goods are delivered seamlessly.	0.70						0.57
26	I will easily give up on those who are unreliable in delivering their products.	0.67						0.49
39	I will change vendors if they poorly handle their deliveries.	0.64						0.48
28	When I'm disappointed in the delivery of something, I don't buy from that place anymore.	0.61						0.46
25	I am loyal to companies that have a well-managed delivery process.	0.59						0.48
36	I like when packages delivered to me are tightly packed.	0.58						0.43
50	During delivery pick up, I check whether the package is damaged.	0.53						0.35
11	I would like to know where my package is at the moment.		0.90					0.89
10	I like to track the delivery of what I ordered.		0.87					0.87
12	I check the status of the shipment as it travels towards me.		0.85					0.80
47	The delivery of the ordered goods is easy for me.			0.82				0.73
53	When someone delivers goods to me, it's a simple process.			0.64				0.47
45	Contact with package delivery people is a pleasant experience for me.			0.64				0.46
48	I don't care who delivers my package.			0.63				0.44
41	The appearance of the package delivery person is an important item to me in the delivery experience.				0.90			0.82
42	The visual impression during the delivery of the goods is important to me.				0.81			0.71
37	The appearance of the delivery vehicle is an important aspect of shopping experience for me.				0.64			0.46
13	I look forward to the delivery of something I ordered.					0.82		0.84
14	I am eagerly awaiting the delivery of the ordered items.					0.81		0.83
19	I am happy when I need to collect the shipment I ordered.	0.36				0.62		0.59
9	I see the delivery of ordered goods as a useful alternative to classic shopping in a store.						0.76	0.66
8	I perceive order delivery as an interesting alternative to ordinary shopping.						0.66	0.52
24	It takes less effort to have the goods delivered to me versus going to the store.						0.42	0.36

Note. h2 = communality; Factors: 1 = Delivery efficiency, 2 = Parcel tracking, 3 = Smooth delivery experience, 4 = Visual appeal, 5 = Joyful anticipation, 6 = Convenience.

Few items had high corrected item-total correlation, in scales Parcel tracking and Joyful anticipation. Those two scales had high MICs, indicating the presence of redundant items. However, this might be expected due to the small number of items. The homogeneity of other scales could be characterized as good. There were no extremely small SMC values (<0.20).The item statistics are shown in Table 4.

Table 3. Psychometric properties and gender differences of the CDX-LMD scales (*N* = 907).

Scale	M	SD	α	CR	AVE	MIC	<i>t</i>	<i>p</i>
Delivery efficiency	4.01	0.81	0.87	0.86	0.45	0.46	−1.36	0.174
Parcel tracking	3.23	1.34	0.95	0.95	0.86	0.85	−0.68	0.496
Smooth delivery	3.54	0.91	0.78	0.79	0.48	0.49	−0.94	0.347
Visual appeal	2.24	1.15	0.85	0.87	0.70	0.66	1.01	0.311
Joyful anticipation	3.96	1.04	0.89	0.89	0.72	0.73	−4.96	<0.001
Convenience	3.40	0.94	0.73	0.76	0.50	0.47	−0.56	0.574

Note. M = mean; SD = standard deviation; α = Cronbach's alpha; CR = composite reliability; AVE = average variance extracted; MIC = mean inter-item correlation. *t* = t-statistic; *p* = *p*-value.

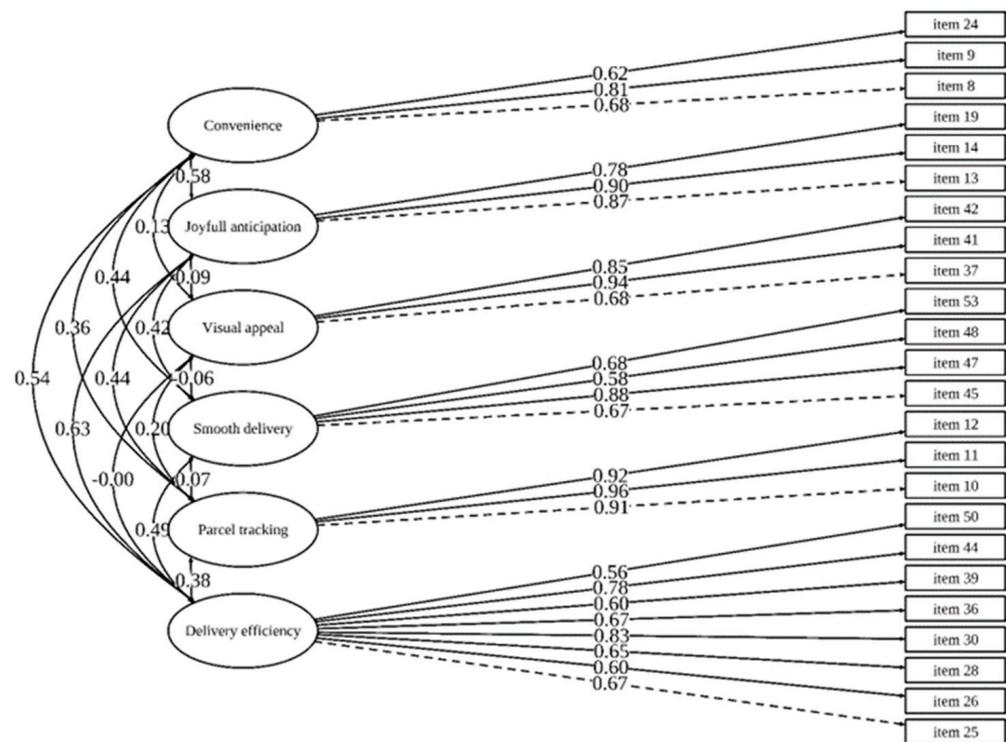


Figure 1. Standardized solution of the CFA model (n = 454). Note. Error variances of the indicators are omitted for clarity.

Table 4. Item statistics CXD-LMD.

Scale	Item	M	SD	SMC	Corr. Item-Total	α If Item Deleted
Delivery efficiency	30	4.265	0.994	0.572	0.734	0.840
	44	4.121	1.095	0.523	0.702	0.841
	26	4.076	1.157	0.394	0.600	0.853
	39	3.884	1.136	0.372	0.600	0.852
	28	3.986	1.159	0.405	0.607	0.852
	25	3.896	1.175	0.395	0.607	0.852
	36	4.039	1.077	0.401	0.601	0.852
Parcel tracking	50	3.828	1.258	0.294	0.528	0.862
	11	3.262	1.404	0.820	0.905	0.907
	10	3.264	1.401	0.788	0.884	0.924
	12	3.180	1.434	0.765	0.873	0.932
Smooth delivery	47	3.642	1.078	0.527	0.724	0.671
	53	3.588	1.175	0.373	0.579	0.739
	45	3.377	1.129	0.361	0.574	0.742
Visual appeal	48	3.538	1.290	0.293	0.514	0.778
	41	2.094	1.313	0.648	0.789	0.728
	42	2.367	1.329	0.615	0.751	0.765
Joyful anticipation	37	2.269	1.279	0.406	0.633	0.874
	13	4.087	1.102	0.679	0.805	0.821
	14	3.914	1.153	0.696	0.820	0.805
Convenience	19	3.873	1.181	0.521	0.721	0.894
	9	3.546	1.143	0.413	0.637	0.530
	8	3.075	1.213	0.346	0.548	0.638
	24	3.569	1.160	0.232	0.465	0.733

Note. M = mean; SD = standard deviation; SMC = squared multiple correlation; Corr. Item-total = corrected item-total correlation.

4.4. Correlations of CDX-LMD Scales with Other Constructs

Pearson correlations are presented in Table 5. Among the CDX-LMD scales, Delivery efficiency had the strongest correlation with Joyful anticipation (which was the strongest correlation among the scales), followed by Convenience. Next, Delivery efficiency had a relationship of about the same magnitude with Parcel tracking and Smooth delivery. Finally, Delivery efficiency had the weakest correlation with Visual appeal. Smooth delivery had non-significant correlations with Parcel tracking and Visual appeal. Those were the only non-significant relationships among the CDX-LMD scales.

Table 5. Correlations of CDX-LMD scales and other variables.

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Delivery efficiency	1															
Parcel tracking	0.37	1														
Smooth delivery	0.36	0.06	1													
Visual appeal	0.15	0.27	−0.02	1												
Joyful anticipation	0.55	0.40	0.33	0.17	1											
Convenience	0.43	0.28	0.37	0.17	0.46	1										
Trust in courier	0.09	−0.01	0.44	0.02	0.15	0.23	1									
DT—home	0.18	0.03	0.17	−0.12	0.17	0.12	0.15	1								
DT—shop	0.01	0.08	0.01	−0.02	−0.03	0.03	0.06	−0.14	1							
DT—parcel machine	0.07	0.08	−0.18	0.16	−0.01	0.03	−0.09	−0.20	0.18	1						
DA—price	0.25	0.09	0.21	−0.07	0.21	0.19	0.25	0.30	0.05	−0.16	1					
DA—speed	0.34	0.20	0.17	0.04	0.30	0.28	0.18	0.28	0.00	0.02	0.43	1				
DA—tracking	0.25	0.52	0.09	0.14	0.23	0.20	0.11	0.14	0.04	0.05	0.28	0.44	1			
DA—address change	0.14	0.25	0.05	0.12	0.15	0.11	0.11	0.03	0.06	0.12	0.22	0.33	0.49	1		
DA—call	0.29	0.20	0.11	0.07	0.29	0.15	0.15	0.22	0.03	0.03	0.32	0.42	0.42	0.43	1	
OSA—way of delivery	0.31	0.19	0.05	0.09	0.25	0.21	0.16	0.18	0.00	0.06	0.37	0.43	0.34	0.30	0.34	1
OSA—courier	0.21	0.23	−0.08	0.25	0.10	0.05	0.08	0.07	−0.01	0.12	0.14	0.27	0.32	0.31	0.23	0.40

Note. DT = Delivery type; DA = Delivery aspect; OSA = online shopping aspect. All correlations $\geq |0.11|$ are significant at 0.05 level. All correlations $\geq |0.14|$ are significant at 0.001 level (with exception of DT home and DA tracking pairs, which are significant at <0.001 level). All correlations $\geq |0.15|$ are significant at <0.001 level. The p -values were adjusted using Holm method.

Furthermore, Trust in courier services was moderately and positively related to Smooth delivery, while it had a weaker correlation with Joyful anticipation and Convenience. Trust in courier services did not correlate significantly with Delivery efficiency, Parcel tracking, and Visual appeal. Delivery efficiency, Parcel tracking, and Joyful anticipation correlated moderately with almost all Delivery aspects and Online shopping aspects. Expectedly, the Way of delivery—the shop, was not related to any of the CDX-LMD dimensions, whereas the Way of delivery—parcel machine, was negatively related to Smooth delivery, and positively with Visual appeal.

Another negative correlation was between Visual appeal and Way of delivery—home, although in small magnitude. These correlations provide insights into the validity of the last-mile delivery experiences. For example, the strongest correlation in the variable set was naturally, between the Parcel tracking scale and Delivery aspect—tracking (measuring how important to the customer the possibility of tracking the ordered item is).

5. Discussion

This research is based on the Olsson et al. [5] last-mile delivery experience network, to quantify customer experiences using a self-reported measurement scale. Olsson et al. suggested that quantitative studies are needed in this area of research, acknowledging that their framework is similar to Lemon et al. [22] with respect to the general model of user experience through the user journey. Both of these models proposed several aspects of customer experience in the complex process of online shopping and purchase of the purchased product—Olsson et al. proposed six dimensions in their framework that served as inspiration for the development of the empirical measurement scales presented in this paper.

In this research, we tried to construct the measuring instrument CDX-LMD, which would evaluate the last-mile delivery experience. Based on the results of the exploratory and confirmatory factor analysis and the inspection of the content of the question itself, we selected six factors, i.e., scales, which can be used to evaluate six aspects of the last-mile delivery experience. Those aspects are Delivery Efficiency (high preference for the efficiency and professionalism of the courier services and e-tailers), Parcel Tracking (the behavior of actively tracking the ordered item), Smooth Delivery (the experience of smooth interaction while receiving a parcel), Visual Appeal (the importance of visual appeal of the courier company as well as the packaging), Joyful Anticipation (the feeling of joy related to the anticipation and reception of a parcel), and Convenience (the belief of usefulness and convenience of online shopping over classical visiting of the store). The scales were then subjected to item analysis, where the satisfactory reliability of each of the scales was determined, and the results suggested the convergent and discriminative validity of the scales. Examining the validity of this instrument should be the subject of future research.

When it comes to the relationship between these aspects, all aspects were moderate to strongly correlated, which means there was a significant interdependence between them. We saw the strongest correlation between the aspects of Delivery efficiency and Joyful anticipation, as well as Delivery efficiency and Convenience, then between Convenience and Joyful anticipation. A somewhat weaker association was between tracking package delivery efficiency and benefits. However, the weakest related aspects were Visual appeal and Smooth delivery. Therefore, these two aspects did not influence each other. It could mean that the users who focused on the visual appeal value the aesthetic characteristics of delivery men and vehicles, while the ease of renaming is not so important for them. On the other hand, users focused on simply downloading the product and valued the practicality and ease of the delivery process itself and not the visual features. This difference in priorities can explain the weaker connection between these two aspects. The weak connection between the visual appeal and positive anticipation and convenience can be explained by the fact that these are different aspects of the customer experience. Positive anticipation refers to the emotions the customer experiences when waiting for product delivery, the convenience of online shopping, and the visual appeal of the appearance of the delivery driver and vehicle. Visual aspects can affect the user's perception of the brand and the overall shopping experience, but they do not directly affect positive anticipation and convenience, and because of the different aspects examined, the relationship between these aspects is weak. All these aspects are essential to set up a positive customer experience in the last-mile message. Thus, it is necessary to keep all these aspects in mind to improve the customer experience in the last-mile delivery. The connection between certain aspects is explained below.

Research indicates the strongest correlation between Delivery efficiency and Joyful anticipation of the product, which could have a major impact on the customer satisfaction. For a better understanding of this correlation, the questions that evaluate this connection and the respondents were analyzed. We can conclude that customers choose to order products from reliable e-tailers, which have a well-managed product delivery, meaning they expect the delivery to be efficient. Thus, they have a feeling of positive anticipation of the product. Customers who look forward to the delivery, expect delivery to be fast and efficient.

On the other hand, customers who are not looking forward to delivery are probably unsure of the delivery efficiency or have had bad experiences in the past. In addition, it was found that there is a connection between secure product packaging and joyful anticipation of the product. This may be because when the package is securely packed, the customer has more faith that the product will arrive in good condition, and when customers expect the product to arrive in good condition, it can add to their excitement and joy about the delivery. These findings indicate that there is a relationship between the Delivery efficiency and Joyful anticipation. Furthermore, when the delivery process works efficiently, it can affect the customer satisfaction. For this reason, e-tailers and logistics service providers (courier services) need to pay attention to these links. E-tailers need to see the importance of efficient product delivery for their customers, and, therefore, choose logistics service providers wisely to improve the experience of their users.

The results also indicate a significant relationship between the delivery efficiency, convenience, and practicality, which is not surprising, because when users order products online, it is often for convenience and to save time compared to traditional shopping in a physical store. Therefore, the process delivery must be reliable and efficient so that online shopping would not be less attractive for users. On the other hand, when customers perceive the delivery process as reliable and efficient, they perceive online shopping as a useful alternative to traditional shopping in a store, which is associated with convenience. Convenience refers to the user's perception that the online shopping process is simpler, faster, and less demanding compared to traditional shopping. Thus, these results indicate the importance of a reliable, efficient delivery process and the user's experience of the convenience and usefulness of online shopping. In the future, research should further explore these relationships to improve the online shopping process and increase the appeal of online stores to customers.

A somewhat weaker but not insignificant correlation was found between the Delivery efficiency with Parcel tracking and the ease of delivery. Delivery efficiency included issues such as delivery efficiency, packaging security, and the absence of problems in the delivery process, while delivery tracking referred to the information available to users regarding the status of their shipments. These results indicate a relationship between how much customers value the delivery efficiency and how much they want to track the delivery status of their products. This can be explained by the fact that, although customers have confidence in the efficiency of delivery, tracking the shipment's status can provide them with additional security and confirmation that the shipment is on its way. The delivery tracking can help them prepare for the shipment's arrival and organize their time. Additionally, tracking the shipment can be an interesting and exciting experience if they are waiting for something important that they have wanted for a long time. While users believe in the efficiency of delivery, there is a possibility that the shipment may be lost, damaged, or delayed. Thus, the shipment status can provide them with confirmation that the shipment is on its way, as well as information about possible delivery problems. The importance of tracking the shipment status, regardless of the belief in the efficiency of the product delivery, can perhaps be explained by the psychological profile of the customer, with a need for control over the delivery process. For this reason, this can be very useful information for all logistics service providers to enable all their users to track the status of the product delivery [70].

As for the relationship between delivery efficiency and ease of product collection, it can be said that this result indicates that it is important for the product collection process to be simple and pleasant for the user. We also saw in theory that there are authors [5,56] who indicate that the level of user satisfaction can vary between different stages of online shopping and that it is essential to measure the user satisfaction in all stages of the purchase path, also in the phase of the process of taking over the product itself. Our results indicate that when the customer receives the goods on time and without problems, he perceives the process as simple and the user is then more inclined to buy from the same e-merchant again. Moreover, when contact with the product supplier is a pleasant experience, the user

feels satisfied and the whole delivery process becomes a positive experience. Therefore, the process of picking up the product must be simple and pleasant for users. These results may suggest to all logistics service providers to pay attention to training their employees to ensure that the product delivery process is smooth, as well as the interaction between the delivery person and the customer. Additionally, it is to ensure that they provide simple product collection processes that allow customers to easily and quickly download their products.

The lower correlation between the delivery efficiency and visual aspect indicates that customers may not care as much about the visual aspects of the delivery person or the product delivery vehicle, as it is important that the delivery process is efficient and that the goods arrive without damage and on time. This does not mean that customers do not appreciate the visual aspect of the delivery, but that this aspect is not as important as other aspects that are directly related to the delivery process itself. Furthermore, it may be that the visual aspects of the delivery are implicitly satisfactory and customers take them for granted, while problems with the delivery process are visible and affect the overall shopping experience. The significant relationship between Convenience and Joyful anticipation suggests that customers value the efficiency and simplicity of the shopping process. When customers buy online, they want to do it quickly and easily, and for that product to arrive in the shortest time, which leads to a feeling of satisfaction and positive emotion. For this reason, logistics providers and e-tailers should pay attention to these aspects. The focus should be on improving the efficiency and practicality of the purchase process and product delivery to increase the positive perception of the purchase among consumers [71].

Vakulenko et al. [9] explained that the last-mile delivery experience has a significant effect on the relationship between the online shopping experience and total customer satisfaction, as well as the important role of the last-mile delivery in the relationship between the online experience and customer satisfaction. Ejdus et al. [23] confirmed that usefulness and ease of use have a significant influence on trust in the courier services in Poland. In comparison, our research showed Trust in courier services has the strongest connection with Smooth delivery, then Convenience and Joyful anticipation. The trust in courier services scale, which is based on the Ejdus and Gulc [23] subscale, is moderately and positively related to the ease of delivery. The connection between trust in courier services and ease of delivery tells us that there is a possibility that this connection is bidirectional, meaning that one aspect can influence the other and vice versa. For example, if customers had a positive experience in terms of easy product collection, this contributed to their increased trust in the courier services, because they provided good service. On the other hand, if customers had a positive experience with a reliable courier service, it contributed to their sense of security and confidence in the product collection process. This two-way relationship suggests that companies should pay attention to both sides of the equation to provide a better shopping experience for their customers. Confidence in the reliability of courier companies (fast and accurate delivery, easy product collection process) can lead to customers feeling safe and comfortable ordering a product online knowing that, by choosing to ship with a courier company they trust, the product delivery process will be simple. It can create a positive experience and lead customers to repeat purchases. Furthermore, it leads to good referrals to other potential online customers. The moderate relationship between the trust in courier services and ease of product collection may mean that when customers trust courier companies, they believe that the product collection process will be easy. This can lead to the feeling that courier companies “care about them” and take care of their needs, which can lead to greater customer loyalty. Given that the trust in courier companies was measured in this research, future research could be focused both on researching the customer trust in e-tailers and the impact of that aspect on other aspects of the product delivery process.

This research has significant implications for product delivery logistics service providers as well as e-tailers. Identifying the factors that affect the customer experience in the product

delivery process allows service providers to focus on key areas that can be improved to improve the customer experience and maintain customer satisfaction. The research identified eight factors in the user experience of the product delivery process, which resembled Olsson et al. [5], which is not surprising since the basis of the CDX-LMD scale is their framework. The two factors skeptical perspective of the delivery process and unpleasant emotions were new insights, which were not foreseen by the mentioned framework, and it was decided to exclude these two factors because we believe that they are not always present in the user's experience, but only when an unforeseen problem occurs in the delivery process. That is, when the product delivery does not go according to plan. It is important to note that this decision does not exclude the possibility that the scales of skepticism and negative emotions appear in other situations, and that these factors could be reconsidered in further research that could confirm these results or provide further classification for factors that influence the user experience in the process product delivery. Perhaps in the future, factors that appear only in specific situations could be included in the survey to obtain a more complete picture of the user experience.

The link between the delivery efficiency and delivery speed is expected because delivery speed plays a key role in delivery efficiency. If a product is not delivered on time, it negatively affects the customer experience and can have a negative overall impression of the e-tailer from which the customer ordered the product. This relationship suggests that fast and reliable delivery contributes to improving the delivery efficiency, implying that delivery speed is an important component of delivery efficiency. E-retailers must take care of this aspect when they outsource logistics providers who will deliver their products. If the customer is not satisfied with the speed of delivery, his dissatisfaction is not only reflected in the logistics provider, but also in the e-retailer from whom he ordered the product, which can negatively affect the merchant's reputation. We see that there is a relationship between the delivery efficiency and the courier's call before delivery, which may indicate that the delivery person's call before delivery can be related to the customer's experience of being informed and involved in the delivery process. When a customer receives a call from a delivery person informing them of the expected delivery time or asking for delivery instructions, it can increase the customer's sense of involvement in the delivery process. Customers feel more confident when they receive information about the delivery times and when they can provide instructions to avoid a potential delivery problem. These results can be useful for companies dealing with the sale and delivery of products online because they can help in understanding the importance of the speed of delivery as well as the importance of establishing communication with customers during the product delivery process.

6. Conclusions

The research subject was user experience with last-mile delivery, and the goal was to create a measuring instrument to measure this experience. The innovativeness of this work is reflected in the proposed measuring instrument, which can be of crucial importance for future research. The results of this work can be useful for researchers in future research on the experience of customers in the process of online shopping and delivery, as well as in developing new instruments for assessing the quality of the service and user experience, and for logistics providers and e-retailers to improve their business and improve the user experience. The contribution of this work is reflected in the creation of a new measuring instrument that will enable the measurement of user experience in the delivery of the last-mile more efficiently and accurately. In addition, logistics providers and e-tailers will be able to use this instrument to improve the quality of their services and increase customer satisfaction. For this reason, this paper, in addition to contributing to future research on this topic, can have a significant contribution to the field of logistics and e-commerce.

This paper provides a practical and quantitative way of evaluating the customer experience with the last-mile delivery process. The proposed measuring instrument can be used by companies and researchers to explore this complex process more deeply. This

work is not without limitations. We could not conclude causal relationships due to the cross-sectional design. Although the psychometric characteristics of the instrument are mostly good, some scales have “too high” homogeneity, which indicates the existence of redundant, i.e., non-informative (very similar to each other) items. This could also be further verified in future research. The participants in the research were from only one country that has the status of a “developing country”. Thus, further research should include insights from other countries with different socio-economic factors.

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Appendix A

Initial 58 LMD questions

1. I am disappointed with my experiences in the delivery of products.
2. It is much easier for me to have the ordered goods delivered to me compared to going to the store.
3. When the goods are delivered to me, I don't have to think much about it.
4. I am worried that there will be some error during the package delivery process.
5. I am frustrated with the delivery pickup process.
6. I perceive the delivery of goods as unreliable compared to shopping in a store.
7. I don't care where exactly my package is as long as I know it is approaching me.
8. I perceive order delivery as an interesting alternative to ordinary shopping.
9. I see the delivery of ordered goods as a useful alternative to classic shopping in a store.
10. I like to track the delivery of what I ordered.
11. I would like to know where my package is at the moment.
12. I check the status of the shipment as it travels towards me.
13. I look forward to the delivery of something I ordered.
14. I am eagerly awaiting the delivery of the ordered items.
15. I am concerned about whether I was sent exactly what I have ordered.
16. I am worried about whether my package will be delivered on time.
17. I am skeptical about the success of the delivery of the ordered goods.
18. The experience of delivering the ordered products is fun for me.
19. I am happy when I need to collect the shipment I ordered.
20. I find fun in waiting for the goods to be delivered.
21. I get angry when there are problems with the delivery of what I ordered.
22. I get nervous when I don't know when the goods will be delivered.
23. Ordering goods and consequent delivery are exciting for me.
24. It takes less effort to have the goods delivered to me versus going to the store.
25. I am loyal to companies that have a well-managed delivery process.
26. I will easily give up on those who are unreliable in delivering their products.
27. I am saddened when the delivery of the order did not go as I expected.
28. When I'm disappointed in the delivery of something, I don't buy from that place anymore.
29. I worry when it is not clear how the goods will be delivered to me.

30. I am happy to order goods from vendors with whom I have no problems with former deliveries.
31. I will pay a higher price if it means better or safer delivery.
32. I easily adapt to conditions related to the delivery process.
33. It is important to me that the packages delivered to me are beautiful.
34. I'm annoyed with waiting for the goods to be delivered.
35. Unsightly package of products turns me away from the next purchase from the same vendor.
36. I like when packages delivered to me are tightly packed.
37. The appearance of the delivery vehicle is an important aspect of shopping experience for me.
38. I understand what I need to do when picking up a delivery.
39. I will change vendors if they poorly handle their deliveries.
40. I get confused when picking up packages.
41. The appearance of the package delivery person is an important item to me in the delivery experience.
42. The visual impression during the delivery of the goods is important to me.
43. I have had unpleasant experiences with delivery people.
44. I will often buy from those with whom my goods are delivered seamlessly.
45. Contact with package delivery people is a pleasant experience for me.
46. The package pick-up process can be complicated.
47. The delivery of the ordered goods is easy for me.
48. I don't care who delivers my package.
49. I am happier when I collect the package without direct contact with the delivery person.
50. During delivery pick up, I check whether the package is damaged.
51. I find the procedure for delivery of goods to be complicated.
52. I find the package pick up process tedious.
53. When someone delivers goods to me, it's a simple process.
54. I like to be in contact with the delivery people.
55. I am frustrated by the fact that I need to see and hear with the delivery person during the package pick up.
56. I would avoid contact with the delivery person whenever possible.
57. I'm glad when another member of the household picks up the package instead of me.
58. The behaviors and manners of the delivery people are important to me when picking up the goods.

Appendix B

Trust in courier service

1. When I shop online, I trust courier companies and their services.
2. I trust the technical solutions of courier companies when I shop online.
3. I am confident in the reliability of courier companies when I shop online.
4. I am confident that I can trust the services of courier companies.
5. Courier companies take into account what is most important to me.
6. In the future, I will use courier companies more often.

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