

# Trust in Courier Services as a Determinant of Service Quality

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## Research

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# Abstract

The article aims to examine relationships between five constructs: the usefulness of courier services (U), the ease of use of courier services (EU), the trust in courier services (T), the service quality (SQ), and the future intention to use courier services (FI). The research focuses on courier services. An electronic questionnaire was used to conduct confidential interviews. It was distributed between January and March 2019. The number of questionnaires returned by courier service customers amounted to 1073. The authors used Generalized Least Squares (GLS) of Structural Equation Modelling (GLS-SEM) to verify the hypotheses. AMOS software was set to test the hypothesised relationships. The obtained results confirmed statistically significant relationships between the variables of the ease of use and the trust in service, the usefulness and the trust in service, the trust in service and the service quality and, finally, the service quality and the future intention to use the services. The obtained results confirmed an important role of technological aspects in courier service quality, which will become the main determinant of the development of this sector in the future. The authors proposed a new approach to the definition of trust in service. Apart from the interpersonal trust, they shed more light on the trust in the supplier, i.e. the trust in the used technologies.

## 1. Introduction

The courier, express and parcel (CEP) market is booming around the world and particularly in developing countries. It is driven by the increasing Internet penetration and the popularity of online trade with growing middle-class population, prosperity and improved living standards. In 2019, compared to the previous year, the global CEP market value increased by 7.9%, reaching EUR 330.3 billion, while in terms of volume, it rose by 9.1% to 60.7 billion packages. According to the forecast, this growing trend will continue in subsequent years [1]. Currently, the European market share amounts to 22% of the global market value and 18% of the volume of shipments. The CEP sector in Europe is highly concentrated, as eight countries

— Germany, Great Britain, France, Spain, Italy, the Netherlands, Belgium and Poland — generate 76% of the European GDP and 80% of the total revenues from courier service in Europe [2]. Compared to other European countries, the dynamics of the CEP market in Poland is one of the highest. In 2018, the courier operators handled 476 million parcels, which was 75% more than in 2014, while the market value increased by 60%, reaching PLN 6.95 billion. The growth rate of the Polish courier market is three times faster than the GDP in Poland. However, the share of the Polish CEP market amounted only to 3% of the European market value, and the volume of shipments was eight times smaller compared to Western countries, in particular Germany, Great Britain or France. In the near future, the growth of the courier market in Poland will be much faster than in other European countries, which places Poland among leaders, next to Holland and Romania, and confirms the potential of the Polish market [3]. In Poland, courier services evolved due to the implementation of modern technologies and the development of e-commerce, which resulted from better access to the Internet and the growing customer confidence in online shopping. This affected the structure of the client base, and B2C services have gradually become

dominant in terms of the volume of shipments [4]. Under conditions of growing competition in the courier market driven by the development of e-commerce as well as increasing customer expectations, the improvement of the quality of courier services is one of the essential objectives for logistics companies [5-7] and a crucial factor in gaining competitiveness and success for online shops [8]. Furthermore, from the perspective of a client, the courier service is the most preferred form of parcel delivery affecting the opinion regarding an e-shop [9].

Customer perceived service quality is often used as a measurement to confirm business performance and market position, and it is acknowledged as one of the key factors of competitive advantage in the market [10]. The perceived service quality measures the level, to which a provided service matches customer expectations [11-13]. As a consequence, it affects customer loyalty [14, 15]. Many research studies concern the identification of determinants of service quality in various sectors and branches. Among the most frequently cited contributions to the literature is a service quality model developed by Parasuraman, Zeithaml and Berry [16]. It presents mainly quality gaps during the preparation and provision of a service as well as ten following service quality determinants: reliability, responsiveness, competence, access, courtesy, communication, credibility, security, understanding and tangibles. The gap model was used as a basis for the SERVQUAL measuring scale of perceived service quality, which has a reduced number of service quality dimensions, namely, tangibles, responsiveness, reliability, empathy, and assurance. The scale was used to measure the perceived service quality of specific products in different branches and, finally, has become the most popular and commonly used scale in the service sector [17]. Both the model and the scale indicate trust as an element comprising determinants of service quality perceived by clients. In the model, the credibility is related to trustworthiness, believability and honesty. While in the scale, the assurance means "knowledge, courtesy, and ability of employees to inspire trust and confidence towards the customers". In the context of the service sector, trust is defined as the level of reliability guaranteed by the service provider to the receiver aiming to maintain and develop a positive relationship between them [18, 19]. Trust in the service provider allows assessing the service or the provider before the consumption of a service. Despite changing conditions, customer trust means confidence that the service will be provided at an agreed appropriate level [20]. As a result, in the service sector, relationships between cooperating entities should be reinforced to eliminate the uncertainty of a client about expected benefits (the received service quality) and to build trust in the service provider. If customer expectations are met or even exceeded by a seller, the customer trust increases and the relationship between these two entities can be strengthened [19].

The relationship between trust and quality of service is two-way. When customers have a better perception of service quality, they are more likely to trust the service. To increase the customer trust, a service provider should make an effort to reduce perceived uncertainties, fluctuations, and risk during the service provision [21, 22]. On the other hand, when customers trust solutions offered by a service provider, their assessment of the service quality is higher [20, 23]. Finally, trust can affect corporate reputation [21] and build customer loyalty [22, 23]. In the context of e-service, trust plays an important role in the provision of high-quality service as there is no direct (face-to-face) relationship between the parties. Examples of such a sector are e-commerce and m-commerce with courier services connected to both.

Unlike a traditional service, where it is possible to inspire trust using physical contacts, it is very difficult to establish a relationship with customers based on trust in cyberspace [25, 26]. Trust plays a critical role in an e-commerce transaction because of the uncertainty and the risk involved [27]. Therefore, various researchers have identified trust as one of key service quality attributes considering the e-commerce specificity [8, 26, 28-30]. Moreover, trust was stated to be the most important factor of e-customer satisfaction [31, 32] and their repurchase intention [33-36].

Even though the courier service is the last and crucial link in online shopping, studies concerning the relationship between trust and service quality are limited. Most research on the courier service was focused on measuring the service quality or customer satisfaction using the SERVQUAL method slightly modified according to the specificity of the express/courier branch [37]. However, only some of them indicated trust as the factor of service quality. Yee and Daud proved that customer satisfaction was affected by assurance, which was connected with knowledge, courtesy of employees and the ability to inspire trust and confidence in customers [38]. Ho et al. found that overall customer satisfaction could be affected by trustworthiness and the quality of information, which would help customers in taking better decisions [39]. Micu et al. examined the quality of logistics service from the perspective of customers buying online. They outlined two dimensions considering the service quality, i.e., the operational service quality and the relational service quality. The relational service quality, which is focused on customer trust and confidence in the retailer's brand, appeared as the most important predictor for both the level of customer satisfaction and the level of customer loyalty [5]. Research conducted by Gulc confirmed that trust, among other factors, played an important role in the evaluation of the courier service quality [23].

Summing up, most previous research on the courier service quality did not consider the specificity of the courier service particular to the branch of e-commerce. Thanks to advanced IT tools and logistics solutions, the courier service is currently rendered to customers without direct face-to-face interaction, so it is gradually becoming based on self-service technology [4]. The development of technology-oriented courier service requires a different approach towards the definition and measurement of trust in service in the context of the service quality and future intentions of customers. This study aims to fill these gaps. The article examines relationships between five constructs: the usefulness of courier services (U), the ease of use courier services (EU), the trust in courier services (T), the service quality (SQ), and the future intention to use courier services (FI).

The article is structured as follows. The next part presents the results of a literature review indicating the role of trust in shaping service quality. A new approach to defining the quality of services is proposed, considering the technological aspect of e-services and the need for consumers to rely on technological solutions. Next, a theoretical model of relations between the examined variables is presented, thus indicating the hypotheses for empirical verification. The next part of the article contains a description of the research methodology. In the section preceding the conclusions, the research results are presented and discussed in the context of other researcher outcomes.

## 2. Trust As A Determinant Of Service Quality – A Literature Review

Under the conditions of growing uncertainty in the business environment and the increasing role of risk, trust seems to be a key factor for interpersonal relationships, and it is also gaining more weight in man-machine, man-institution and man-product relationships.

Initially, relationships based on trust referred only to interpersonal relationships, i.e. those occurring between two or more people (interpersonal trust) [40-46]. Over time, the concept of trust has been applied to institutions/organisations (institutional trust, organisational trust) [47, 48], objects, devices or technology (technology trust) [49-52].

A new promising research area includes the definition of trust in service that is increasingly provided without direct contact between the service provider and the customer. Ben-Gal et al. confirmed that the success of service delivery is a multi-dimensional phenomenon [53]. The attempts to develop a definition of trust in service were usually based on two approaches, i.e., performance-related (reflecting competence, customization, reliability, and promptness) and personality-related (emphasising empathy, politeness, and similarity) [54].

With the development of many categories of global services (e.g., retail banking, fast-food chains, and rental car agencies), it is difficult to build relationships based on trust [55]. With growing frequency, self-service technologies replace direct contacts with the service provider. Trust in service is becoming particularly crucial in the case of limited access to information, incomplete information, and the increasing role of risk and uncertainty. The abstract nature of services will always remain the source of customer risk and uncertainty [54].

Trust was an object of scientific interest in relation to such services as life insurance [56], education [53], e-commerce [27, 57], social media [58], technology consulting [59], the Internet of Things (IoT) [60], m-payment [61], healthcare [62], mobile money [63], online services [43, 64, 65], and the use of blockchain [66].

Examining the relationship between trust and future interactions among customers and financial advisors, Johnson and Grayson focused on cognitive trust and affective trust, at the same time relating trust to interpersonal relationships [67]. Sekhon et al. developed a service trust model that included the overall trust and customer disposition to trust in service, leaving out the cognitive trust and affective trust [18].

A different approach to defining trust in service was adopted by Ben-Gal et al. [53]. Referring to the model by Dietz & Den Hartog's [68], the authors treated trust as actions (actionable trust) resulting from previous beliefs and decisions [53]. Actionable trust has been defined by the authors as the propensity for recommending a particular service to subsequent potential consumers. The conducted research confirmed that actionable trust was a dominant factor in the service success, thus called for the need to focus on the relational aspect of service encounters [53].

The development of e-services affects the importance of other factors [69]. The dynamic development of e-services (e-commerce and m-commerce) also requires building trust-based relationships that determine the quality of services. Following the traditional typology of trust (personal, institutional, and trust in technology), trust in service is a combination of trust in the institution itself (the service provider/vendor), interpersonal trust and the applied technologies.

The type of provided services and the character of relationships (direct or indirect) between the service provider and customer determine the process of creating trust-based relationships. In the case of direct contact of the customer with the service provide (financial insurance and advisory services), human and social factors play a more significant role in the process of trust-building. On the other hand, in the case where a service is provided in the form of e-services (e-commerce), physical and technological factors gain significance.

According to Mcknight et al., the understanding of the factors that determine consumer trust in service vendors (and the services themselves) allows service providers to build their strategies for achieving the ultimate goal – greater acceptance of the B2C (business-to-customer) electronic commerce [70].

Chaparro-Peláez et al. analysed trust in e-commerce services in the context of consumer willingness to accept weaknesses and failures related to the provision of services and their expectations for the improvement and elimination of these failures [57].

Abdul-Hamid et al. researched the mobile money service and distinguished two categories of trust: service provider trust and economy-based trust. Trust in the service provider was related to the safeguard of personal information and money, while the economy-based trust was more related to the functionality of the solution saving costs and time as well as the economic rationality [63].

Mcknight et al. investigated initial trust, i.e., trust in an unfamiliar web vendor, and developing and testing a Trust Building Model (TBM) [70]. Trust in the vendor was defined as a multi-dimensional construct with two components, namely, trusting beliefs (perceptions of the competence, benevolence, and integrity of the vendor) and trusting intentions – the willingness to depend (a decision to make oneself vulnerable to the vendor). In their model, the authors proposed three factors for building consumer trust in the vendor: structural assurance (consumer perceptions of the safety of the web environment), perceived web vendor reputation, and perceived web site quality [70].

Research on human behavioural issues in relation to online services highlights the need to incorporate a trust variable that better explains the acceptance of electronic services by their users [71, 72].

Despite the unquestionable importance of trust, the construct is conceptualized and measured very differently [55]. An overview of the definitions of trust in service and measurement scales is given in Table 1.

Until now, the process of defining and measuring trust in service has mainly focused on interpersonal relationships between the service provider (vendor) and the consumer. A different approach to trust must

be developed for defining and measuring service, having in mind two different types of services, i.e. human-oriented and technology-oriented, and with particular regard to the second group. The development of services with the help of ICT technologies (i.e., technology-oriented services), which replace interpersonal relationships, requires adopting a new approach to trust research, which also considers trust in material, physical factors. Many authors agree that trust does not only refer to interpersonal but also human relationships with technologies [65]. In many areas, relationships between customers and service providers are continuously replaced with various self-service technologies (e.g., in the banking industry) [76].

For example, the development of distance-learning technologies requires their users to have the skills to operate specific software solutions and, thus, to rely on these technologies. Many researchers indicate that research of online transactions should also focus on two dimensions of trust: trust in transaction partners and trust in infrastructure (technology) [77, 78]. When it comes to using services based on ICT in virtual environments, there are always two important players: the service provider and the technology, on which the service is based [74]. In the context of the development of electronic commerce, Ratnasingham stated that the virtual environment required trust to make it work. Technology alone is not enough [79]. According to Williams et al., trust in technology is a crucial determinant for the uptake of m-payment service by customers [61]. Trust in the government and the Internet were also the main factors contributing to citizen trust in e-government [80].

Courier service is the last and crucial step in the process of Internet shopping. More and more often, it is rendered to customers mainly using non-human interfaces based on information technologies and modern logistics solutions. The ICT tools used in courier service not only provide more convenience for consumers and business clients, but also offer more personalization options for online ordering, tracking, and payments [81]. Based on modern technologies, e-customer service provides current information to the customer about order processing and also enables order management and communication through the website or application of a logistics operator. The most advanced IT systems often integrate shipping companies to provide comprehensive service for the sender (manufacturer, seller) and support electronic order processing. Due to the increasing popularity of m-commerce, the courier operators offer special applications for clients and receivers to monitor the status of shipments and also change the place and time of delivery or even open a parcel locker [82, 83]. Another solution based on information technology, which is crucial for parcel receivers in e-commerce, is Pick-up Drop-off network (PUDO), where customers can collect and return ordered products. The most used among these delivery solutions are pickup points in commercial centres and automated parcel lockers, which are more popular because of convenient location and access [84-86]. The use of artificial intelligence by courier enterprises is becoming more frequent, especially seeking to contact customers through bots or chat-bots, which are gradually replacing traditional customer service. Experts predict that in the future, courier service will be provided without human assistance, thanks to artificial intelligence, automatization systems and autonomous vehicle or drones [81, 87].

Summing up, the rapid development of digitalization and modern technologies have been already transforming all transport and logistics segments, and it is expected to be the most impactful trend over the coming years, reshaping the entire courier branch. Therefore, the technology-oriented courier service supporting e-commerce branch requires a special research approach to customer trust in modern technologies and multicriterial approach [88]. Similar to the e-service and online shopping, trust in technologies should be examined as one of the key factors affecting the perceived service quality and future intentions of clients.

Considering the above, while building the model of factors that shape the quality of courier services, the authors focused on the technological aspects of the services. The starting point was the extension of the model of technology acceptance by the trust construct.

### 3. Research Model And Hypothesis

- **Ease of Use, Usefulness and Trust**

In the case of courier services, the authors proposed to extend the existing scale for the measurement of trust in service by elements related to material and technological factors of the service process.

Many theoretical models have been developed to explain the processes involved in technology acceptance. In this approach, technology is defined very broadly and often concerns the service itself. Davis, the founder of the commonly used Technology Acceptance Model (TAM), defined the two main constructs in his model as follows:

- perceived usefulness is the degree to which the user is convinced that using a particular system/technology will improve the results/results of the work/activities.
- perceived ease of use is the degree to which the user is confident that by using a particular system/technology he/she will be 'free' from physical and mental effort [89].

Trust is one of the important constructs determining the level of acceptance and technology use, which is often reflected in models. Belanche et al. recommended that researchers dealing with online service research should delve into TAM mechanisms, noting the positive and integrative effect of trust on adoption [90]. Other authors also added a new construct, such as trust, into the traditional Technology Acceptance Model [91, 92]. Most studies consider the trust variable in technology acceptance models. On the one hand, they refer to trust as the factor determining the perceived usefulness and on the other hand, as a factor depending on the perceived ease of use.

Many researchers dealing with the factor influencing trust in different categories of services have shown statistically significant relationships between the variables of the usefulness or the ease of use and the trust in service [90, 93-95].

Pavlou and Gefen analysed the impact of the variable of the ease of use and trust in technology and showed that the ease of use had a positive impact on the level of trust in technology [96]. Similar results were obtained by Klein, who focused on online communication systems between a doctor and a patient [97].

Chandra et al. noted that consumer trust was a significant determinant of perceived usefulness in m-payment due to the impersonal nature of the mobile Internet environment and the uncertainties involved in such transactions [74]. Although other authors, e.g. Mcknight et al. did not include the construct of usefulness in their Trust Building Model (TBM) and eventually adopted the perceived site quality construct, which reflects the usefulness of the proposed solutions based on the example of online advisory services [70]. By perceived site quality, the authors understand the technical performance of a website, the simplicity of its navigation and finding information, and the clarity of indications of how to contact or communicate with the service provider. Considering the above, the authors formulated the following two hypotheses:

H1: The ease of use of courier services has a strong and positive influence on trust in courier services.

H2: The usefulness of courier services has a strong and positive influence on trust in courier services.

- **Trust and Service Quality**

In terms of trust, service quality is an object of interest from various points of view, i.e., from the perspective of the quality of the service provider (which is a more human approach) and from the standpoint of the quality of solutions ensuring high quality of services provided (which is a more technological approach).

Wang et al. assumed that system quality was an important aspect of evaluating the system and examined the relationship between the quality of e-financial services and trust in the services [59]. The authors proved that system quality, which demonstrated the professionalism and trustworthiness of the financial service, promoted customer trust in the service. The authors positively verified the hypothesis that customer-perceived system quality was positively associated with their trust in the system. Similarly, Qureshi et al. proved that trust in the service provider was strongly dependent on the quality of the website offering e-commerce services [98]. Research conducted by McKnight et al. confirmed that site quality was a strong predictor of trust in the vendor [70].

Other authors also pointed out that technical factors shaping the quality of services played a greater role in ICT-based services without direct face-to-face contact between a buyer and a seller. Depending on the type of service, technological factors may relate to the quality of information, the appearance of the application or interface, and the security of information transfer. For example, Fung and Lee stated that the quality of site information and a good interface design increased consumer trust [99]. Research by Hsu et al. confirmed a statistically significant impact made by the trust in websites on the level of satisfaction with the use of websites and the quality of websites [100]. Weerakkody et al. researched user

satisfaction with e-government services and proved that the quality of information and the system had a significant relationship with trust and user satisfaction [101]. Colesca empirically verified the hypothesis that perceived quality positively influenced the trust in e-Government services [102]. The proposed model shows that better quality increases the trust of citizens in e-government services.

The authors of the study did not examine the initial trust but focused on the trust resulting from the previous experience of service consumers; therefore, they assumed that it might determine the service quality perceived by consumers. Thus, the authors proposed the following hypothesis:

H3: The trust in courier services has a strong and positive influence on perceived courier service quality.

- **Quality and Future Intention**

Many authors have studied various aspects of the quality of provided services, e.g. the quality of websites, the quality of information, the quality of services and their impact on consumer intentions to purchase in the future.

Researchers of IT systems confirmed that factors related to the quality of systems played a role in their future use [103]. McKnight et al. examined two specific trust-building levers: the website quality and the perceived reputation, and their influence on initial purchase intentions. The authors verified a hypothesis regarding the perceived site quality having a positive relationship with the willingness to depend on a web vendor [70]. Qureshi et al. observed both direct and indirect relationships between perceived website quality and repurchase intention [98]. Therefore, in this study, the authors proposed the following hypothesis:

H4: Perceived courier service quality has a strong and positive influence on the future intention to use courier service.

Fig. 1 presents the theoretical model that reflects links between all variables and hypotheses.

## **4. Research Method And Measurement**

- **Data**

The research focused on courier services. A survey was used to collect research data, which was done using the CAWI (Computer Assisted Web Interview) technique. Questionnaires were distributed to individual customers who had used courier services to order products via the Internet in the last three years. A link to the electronic research questionnaire was placed on the website of the Bialystok University of Technology and popular social media outlets.

Due to the lack of data on the number of persons using courier services in Poland, the general population was assumed to be the number of persons ordering or buying goods or services via the Internet for private use. In 2018, according to the Central Statistical Office (GUS), the number amounted to 14 094

377 persons. The minimum sample size was 1067, assuming a confidence level of 0.95 (1- $\alpha$ ) and a maximum permissible error of 3% calculated for the general population of about 14 million persons ordering or buying goods or services via the Internet. An electronic questionnaire was used to conduct confidential interviews; it was distributed between January and March 2019; 1073 questionnaires were filled and returned.

577 (53.8%) of respondents were women, and 496 (46.2%) were men. 32.4% of respondents were 36–45 years of age (348 persons), 20.8% (223 persons) were 26–35, and 17.8% (191 persons) were 46–55. The age groups of 18–25 and over 55 constituted about 14% of the respondents each (14.7% or 158 persons and 14.0% or 150 persons, respectively). Three persons were under 18 (0.3%).

- **Measures**

As many variables in the theoretical model are directly unobservable, a series of measures was used in each case. Based on the literature review, four items were identified to measure the usefulness of courier services (U), three – the ease of use of courier services (EU), and five – the trust (T) in courier service. Service quality (SQ) and future intention (FI) to use were measured directly by using one item. For some constructs, the measurement variables were modified to highlight the more technical aspects that determine trust in service (Table 2).

The constructs were measured using a seven-point Likert scale (1=totally disagree to 7=totally agree) or five-point Likert scale in the case of Service Quality assessment (1 – very low service quality, 5 – very high service quality. Structural Equation Modelling (SEM) was used to verify the hypothesis. Alpha Cronbach's coefficients of the constructs were used to verify the reliability of the scale and proved the acceptable reliability of the scale ranging from 0.848 to 0.929 (Table 2). Descriptive statistics and composite reliability for the constructs and items are presented in Table 2.

## 5. Results And Discussion

To verify the hypotheses, the authors used Generalized Least Squares (GLS) of Structural Equation Modelling (GLS-SEM). AMOS software was set to test the hypothesised relationships shown in Fig. 2. GLS is a tool for estimating latent variables in a linear regression model.

Source: elaborated by the authors.

The appropriateness of the measurement model was assessed using the Chi-Square statistics. According to Table 3, the  $\chi^2$  value was statistically significant ( $\chi^2 = 321.84$ ,  $p < 0.005$ ) indicating the fit between the model and the data. The use of other parameters also confirmed a good fit of the model. The approximate fits were good, specifically, the Normed Chi-Square ( $\chi^2/df$ ) value = 5.191, RMSEA = 0.064, GFI = 0.958, AGFI = 0.929. Consequently, the model was likely to be interpreted as a real model of the relationship between the variables. The values obtained were at an acceptable level for this heuristic [113-115].

The positive verification of two hypotheses, H1 and H2, showed that the usefulness and the ease of use had a statistically significant influence on trust in courier services. The diversification of regression coefficients indicated that the usefulness (U) had a greater impact on trust in courier service than the ease of use (EU). In the light of the obtained results, trust in courier service had a strong and positive influence on courier service quality, which allowed the hypothesis H3 to be positively verified. The research results confirmed that the courier services quality had a strong and positive influence on the intention to use courier services in the future and, thus, allowed to verify the hypothesis H4 positively (Table 3).

The obtained results are consistent with conclusions reached by other authors. Other authors mainly analysed two variables taken from the model of technology acceptance, namely, the ease of use and the usefulness in the context of their relationship to trust. Pavlou and Gefen [96] and Klein [97] also confirmed a positive impact made by the variable of the ease of use on trust in technology in the case of communication services. Belanche et al. confirmed that in the case of online services, trust was affected by the perceived ease of use and directly affected the perceived usefulness [90]. The perceived trust, among other factors, was identified by Hampshire as a key predictor of the perceived usefulness of mobile payment systems [116]. In the adopted model, trust in service was understood as a construct having a more technological character, so the questions were focused on technological solutions offered by a courier service provider. For this reason, it was also assumed that the two key variables taken from the original TAM model (i.e., the ease of use and the usefulness) would determine the trust in service. The obtained results confirmed that both variables – the ease of use and the usefulness – had a statistically significant impact on trust in courier services, thus allowing for the verification of hypotheses H1 and H2. However, comparing the factor loadings for both variables, it was clear that the usefulness variable had a stronger impact on trust in service.

In this study, trust was treated as a determinant of service quality similarly to other research [21, 117]. The difference in the model assumption resulted from the fact that most other researchers treated trust in service as an interpersonal trust or institutional trust in the service provider. However, a more technology-oriented definition of trust (trust in service, meaning trust in technology offered by a service provider) meant that trust could be a determinant of service quality. The achieved results allowed the hypothesis H3 to be positively verified, which reflected the relationship between trust in courier services and the perceived courier service quality.

Positive verification of hypothesis H4 indicating a statistically significant impact of the perceived courier service quality on the future intention to use courier service is consistent with the results of other researchers dealing with service quality issues [34].

## 6. Conclusions

Growing competition in the field of courier services and the dynamic development of e-commerce and m-commerce drive further improvement of service quality and the search for new

innovative operational and technological solutions. The success of a courier company also depends on organisational, social and technological factors. Soon, we should expect further digitalization of logistics processes with the help of modern technologies, such as the Internet of Things and Big Data Analysis. Also, the provision of logistics services will be supported by robotics, automation and self-learning systems. The success of courier services will, therefore, depend on the acceptance of new technological solutions by their users.

This research aimed to determine the impact made on trust in courier services and their quality by two basic variables taken from the model of technology acceptance. The authors proposed a new approach to the definition of trust in service that focused on trust in the supplier or trust in the used technologies additionally to the interpersonal trust.

The obtained results confirmed statistically significant relationships between the variables or the ease of use and trust in service, the usefulness and trust in service, trust in service and the service quality, and, finally, the service quality and the future intention to use the service.

Even though the research generated new knowledge, it had limitations. First, the future intentions to use courier services were a dependent variable in the adopted theoretical model. Although the intentions are important, many authors pointed out the need to consider the current state of the use of services while devising models. In the proposed model, the quality of courier services was evaluated directly using a subjective assessment of the service quality.

The research findings suggest several directions for future efforts. The dynamic development of courier services and technologies focused on end-consumers indicate that future research should attempt to address specific technological solutions proposed by courier companies. The degree of technological maturity of courier services and the readiness of consumers to accept them will determine the future development of the sector.

## **Abbreviations**

GLS – Generalized Least Squares

GLS-SEM – Generalized Least Squares of Structural Equation Modelling of Structural Equation Modelling

SEM – Structural Equation Modelling

CEP – courier, express and parcel market

B2C – business-to-customer

TBM – Trust Building Model

TAM – Technology Acceptance Model

PUDO – Pick-up Drop-off network

CAWI – Computer Assisted Web Interview

## Declarations

### Availability of data and materials

The datasets used and analysed during the current study are available from the corresponding author on reasonable request.

### Competing interests

The authors declare that they have no competing interests.

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### Authors' contributions

The authors equally contributed to the elaboration of this study. All authors read and approved the final manuscript.

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## Tables

**Table 1:** Definition of the trust in service and examples of measurements.

Trust in service definition	Trust measurement scale	Service sector
Customer perceptions of service representative honesty, integrity, and ethical standards [54]	Service provider: <ul style="list-style-type: none"> <li>· is trustworthy,</li> <li>· keeps my dealings with him confidential,</li> <li>· is honest,</li> <li>· has a great deal of integrity,</li> <li>· has high standards of work,</li> <li>· has principles.</li> </ul>	health insurance, management consulting, telecommunications, travel industry service providers
Trust in the community of sellers, is defined as the buyer's beliefs that sellers in the online marketplace (the community of sellers) will behave fairly (benevolence), capably (competence), and ethically (integrity) [73]	Sellers: <ul style="list-style-type: none"> <li>· are honest,</li> <li>· care about buyers,</li> <li>· are trustworthy,</li> <li>· provide good services.</li> </ul>	online auctions
Trust is defined from two perspectives: trust in a mobile service provider and trust in technology facilitated by the mobile service provider [65, 74]	I trust mobile payment systems as they are: <ul style="list-style-type: none"> <li>· reliable,</li> <li>· secure,</li> <li>· trustworthy.</li> </ul> I trust that mobile payment systems do the job correctly, even if they are not monitored.  I trust mobile payment systems.	mobile payments

Trust in service definition	Trust measurement scale	Service sector
<p>Authors distinguished two categories of trust: economy-based trust and service provider trust [63]</p>	<p>I trust that mobile money service providers will:</p> <ul style="list-style-type: none"> <li>· safeguard my personal information,</li> <li>· safeguard my money,</li> <li>· not run away with my money.</li> </ul> <p>Using mobile money services;</p> <ul style="list-style-type: none"> <li>· saves time,</li> <li>· saves cost,</li> <li>· is economical.</li> </ul>	<p>mobile money service</p>
<p>Trust in an online vendor as beliefs which includes integrity, benevolence, ability, and predictability [59, 75]</p>	<p>The online vendor:</p> <ul style="list-style-type: none"> <li>· is honest,</li> <li>· cares about customers,</li> <li>· is not opportunistic,</li> <li>· provides good services,</li> <li>· is predictable,</li> <li>· is trustworthy,</li> <li>· knows its market.</li> </ul>	<p>online shopping</p>

Trust in service definition	Trust measurement scale	Service sector
<p>Three factors are proposed for building consumer trust in the vendor:</p> <p>structural assurance (i.e., consumer perceptions of the safety of the web environment), the perceived</p> <p>web vendor reputation, and the perceived website quality [70]</p>	<p>The structural assurance of the web:</p> <ul style="list-style-type: none"> <li>· The Internet has enough safeguards to make me feel comfortable using it to transact personal business.</li> <li>· Legal and technological structures adequately protect me from problems on the Internet.</li> <li>· I feel confident that encryption and other technological advances on the Internet make it safe for me to do business.</li> <li>· In general, the Internet is now a robust and safe environment for business.</li> </ul> <p>Vendor reputation:</p> <ul style="list-style-type: none"> <li>· well respected by profession,</li> <li>· a reputable firm.</li> </ul> <p>Web site quality:</p> <ul style="list-style-type: none"> <li>· the site worked very well technically,</li> <li>· it resembled other sites I think highly of,</li> <li>· it was simple to navigate,</li> <li>· it was easy to find the information I wanted,</li> <li>· it clearly showed how I could contact or communicate with an advisor.</li> </ul>	<p>legal advice services</p>

Source: elaborated by the authors.

**Table 2:** Constructs and items

Constructs	Ident.	Items	Mean	Cronbach's alpha
The usefulness of courier services [104-107]	U1	Thanks to courier services, I can purchase a product in an online store faster.	5.93	0.856
	U2	Courier companies ensure the secure delivery of products purchased from the online store.	5.46	
	U3	Courier companies deliver products purchased from the online store to a place convenient for me.	5.71	
	U4	Using courier services when shopping online improves my living/working conditions.	5.70	
Ease of use of courier services [89, 104, 106, 108-110]	EU1	I easily learned to use courier services when shopping online.	6.26	0.848
	EU2	The tools enabling the use of courier services when shopping online are simple and understandable.	6.07	
	EU3	I do not see any problems in using courier services when making purchases via the Internet.	5.85	
Trust in courier services [18, 102, 110, 111]	T1	I trust courier companies to use their services when shopping online.	5.27	0.929
	T2	I trust the technical solutions of courier companies related to shopping online.	5.33	
	T3	I believe in the reliability of courier services when shopping online.	4.92	
	T4	I am confident that I can rely on the services of courier companies.	4.87	
	T5	Courier companies take care of my best interests.	4.40	
Service quality	SQ	The overall level of assessment of the service quality provided by courier companies.	3.70	n.a.
The future intention to use [74, 106, 107, 108, 110, 112]	FI	I intend to use courier services more often.	4.81	n.a.

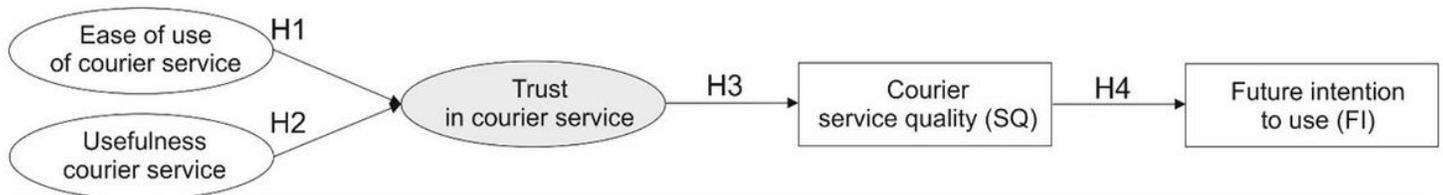
Source: elaborated by the authors.

**Table 3:** Results of the verification of hypotheses

Hypothesis	Estimate	S.E.	C.R.	P	Test results
Hypothesis (H1). The ease of use of courier services has a strong and positive influence on trust in courier services.	0.189	0.064	2.949	**	Support
Hypothesis (H2). The usefulness of courier services has a strong and positive influence on trust in courier services.	0.773	0.048	16.226	***	Support
Hypothesis (H3). The trust in courier services has a strong and positive influence on perceived courier service quality	0.279	0.016	17.245	***	Support
Hypothesis (H4). Perceived courier service quality has a strong and positive influence on the future intention to use courier service.	2.888	0.193	14.962	***	Support
$\chi^2 = 321.84$ ; d.f. = 62; $\chi^2/d.f. = 5.191$ ; $p < 0.005$ RMSEA = 0.064; GFI = 0.958; AGFI = 0.929 *** $p < 0.001$ , Hoelter – 272 Adopted level of the statistical significance was 0.001					

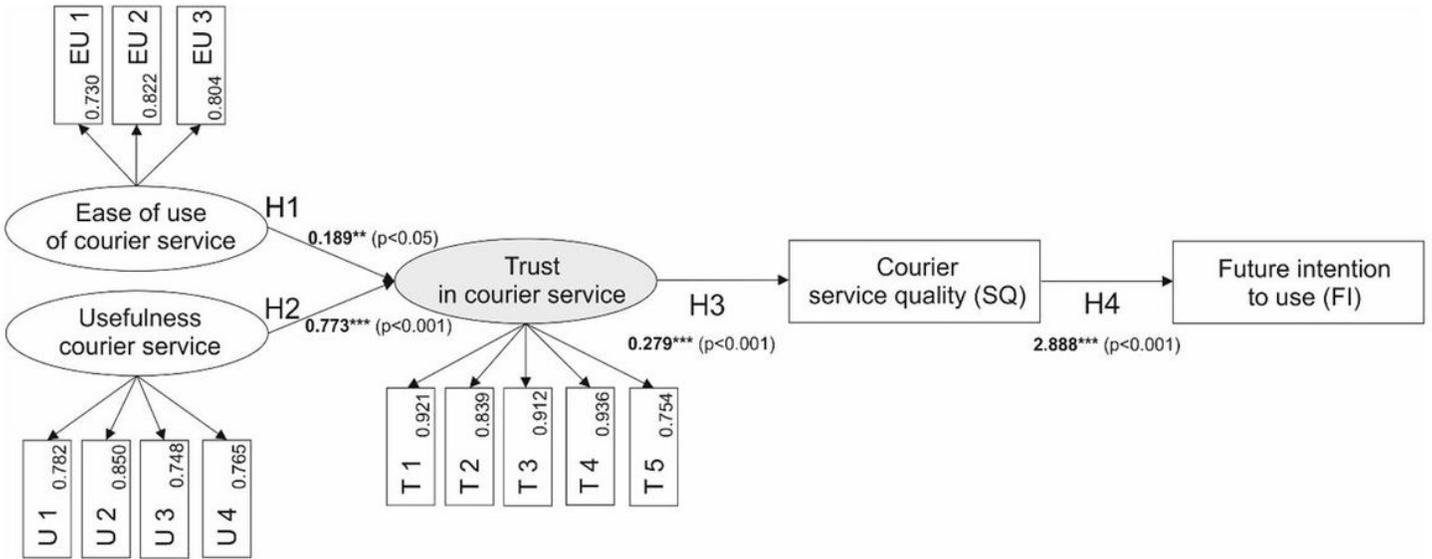
Source: elaborated by the authors.

## Figures



**Figure 1**

Theoretical model.



**Figure 2**

Measurement model.